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Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. January 31, 1916 No. 1

ANNOUNCEMENTS.

New York Section.—A meeting of the New York section will be held at the Machinery Club, 50 Church St., on Thursday evening, February 24, preceded by a dinner at 6:30.

The subject for discussion at this meeting will be the preliminary report of the Committee on Standardization. This committee, and the Council of the Society, are particularly anxious to secure an expression of opinion from members respecting this report. Many contributions have been received from members and from non-members, who are interested in standardization. As appears on another page of this bulletin, the Institution of Mining and Metallurgy and the Canadian Mining Institute are both interested in this report and desire a full discussion of some points before a final report is formulated. The San Francisco section has given an evening to its discussion, and the Council of the Society feels sure that ample material has been presented to furnish one or more meetings with very interesting debate.

Bound Volumes.—The bound volumes of the bulletin for the year 1915 will be issued, as usual, early this year and at the usual price of $1.50 per copy. In the past it has been customary to request members to remit for the bound volumes a year in advance. This year, members will be asked to remit dues for the year 1916 and the cost of binding their volumes for 1915, if they have not already done so. A few complete sets of unbound volumes for the year 1915 can be furnished to members without charge.

Dues.—Dues for the year 1916 are now payable and may be sent to the Treasurer, L. D. Huntoon, at 115 Broadway, New York City.

COMMUNICATIONS.

STANDARDIZATION.

George A. Packard.—In the discussion of the report of the Committee on Standardization I notice a suggestion that the conclusions may be embodied in the letter of transmittal. I think that this would be rather unwise, as the letter of transmittal sometimes becomes separated from the report and very often a man's conclusions reflect something which he has seen but which he does not express in his report. I recently had to go over a report made by an engineer upon a property which had been idle for some time. From this report I gained a rather favorable impression, and thought the property might perhaps be worth reopening. Subsequently I saw the letter of transmittal, in which the engineer said "I would pay no attention to the old veins but would confine the work to exploring the limestone zone." This gave me an entirely different opinion of the property.

It seems to me that the logical place for the conclusions is after the statement of facts and the line of argument. An index on the first page of the report shows the exact page where the conclusions may be found. Personally, I like a brief summary of the entire report, not over two pages, which may also include the gist of the conclusion, and which precedes the report.

Edward Walker.—Mr. H. Foster Bain has written you drawing your attention to recent editorials in "The Mining Magazine" on Weights and Measures and Standard Screens, and he has generously mentioned that I was the writer. The subject of screens has always been of interest to me, and I wrote editorials in the Magazine once before, when Theodore Hoover brought forward his propositions. I have always advocated the use of the smallest amount of metal per unit area consistent with strength. I am aware that there may be some consideration that has escaped my attention, when I make certain alternative proposals in the editorial, but I am anxious that some discussion shall appear in the Magazine, in order to arouse discussion; hence, any criticism of my suggestions will be welcome.

Weights and Measures.—(From *The Mining Magazine,* Oct., 1915.) It is well to revert occasionally to a consideration of the present heterogeneous collection of antiquities that passes for a system of weights and measures in the English-speaking countries, and to inquire into the possibility of introducing reforms or standardizations. This subject may be approached in various ways. For instance, we may either

discuss the total abolition of present units and the adoption of the metric system, thus following the lead of the Latin and Teutonic races, or decide whether it is more expedient to retain the present system and confine our activities to introducing minor reforms and securing a standardization of usage. Then again, the subject may be discussed according as it affects the convenience of the individual, the convenience of a particular trade or profession, or from the wider point of view of the requirements of the body politic.

Let us take first the general question of the convenience and adaptability of the metric or decimal system. Many people object to the adoption of a system of units each ten times greater in the ascending scale or one-tenth in the descending scale, holding that 10 has only two aliquot parts, 2 and 5, so that there is no provision for sub-units such as one-third, a quarter, or one-sixth. They urge that the recurring decimal introduced by the 3 is a factor inimical to precision, and that a continuous division by 2 soon introduces a long string of decimal figures. It has always seemed remarkable to us that the average man does not recognize the fact that both the ancient and modern systems of arithmetical enumeration are decimal systems as far as the numbers above unity are concerned, and that the application to amounts less than unity is not only logical but highly convenient. The decimal system was originated when the symbols 1 and 0 when placed together were made to signify ten. The inventor of the decimal point rendered an immeasurable service to the advancement of exact science, for it is clear that irregular amounts less than unity cannot be gauged by adding together sub-units of the type of 1/3, 1/4, 1/64, etc. Such a proceeding would be too much like that of the Irishman who was given a 2 ft. rule wherewith to measure the width of a window; he came back with the rule, a piece of string, a brick, and a chip of wood whittled to fit. As we are used to having units in multiples of ten, why should there be inconvenience with similar units for subdivisions? The necessity for a sub-unit one-third of another is not obvious. The relationship of the foot to the yard is on this basis, but we could manage perfectly well with either only one or the other. The silver fourpenny piece, representing one-third of a shilling, was not wanted by anybody, and it was abolished. No doubt the duodecimal system would be theoretically more ideal, and if the human race had been made with five fingers and a thumb on each hand, this system would, of course, have been adopted. Other symbols in the Arabic notation would have been required for ten and eleven, and the symbol 10 would have represented twelve. But we cannot go back to the Creation for arithmetical reforms.

The only serious competitor of the decimal system is that based on the continuous division by 2. For instance, we find this system firmly rooted in the machine-shops and on the Stock Exchange. In the last-named center of activity, it holds sway against both the decimal and duodecimal systems, for quotations are not given either in shillings, nor in pence. Fractions of a pound are given as 1/2, 5/8, 13/16, or 21/32, and fractions of a shilling at 1½d., 3d., 4½d., or 7½d. Why these cramping measurements should be used in these two businesses is not clear, especially so with the Stock Exchange, where pounds and shillings so obviously afford a greater scope of variation. Before passing from this phase of the subject, we may remark that the desire to keep sub-units in symmetrical array has a real aesthetic basis, and thirds, sevenths, twelfths, and sixty-fourths are for that reason attractive, and are more

concise than the fraction given approximately to three or four places of decimals. But nature does not always help in this exactitude of sub-units, the best example being the sub-divisions of time, where the day, month, and year are not related in any simple ratio.

So much then for the general question of the metric or decimal system. We may now proceed to the particular, and ask what inconvenience would arise to the mining and metallurgical professions from the adoption of the metric system of weights and measures. The depth of a shaft or winze, the height of a raise, and the length of a drift could be measured as easily in metres as in feet or fathoms. Short or long tons of ore and long tons of concentrate would be merged in the metric ton, and much confusion avoided. Grammes would be as conveniently used as pennyweights in measuring gold content per ton, and grammes or kilogrammes for silver content, while kilogrammes would serve the purpose for reporting total output. Kilogrammes of cyanide and lime would do just as well as pounds. Gallons of water would be as well expressed in tons, cubic metres, or litres, compressed air in cubic metres, and timber in cubic metres instead of cords. In the chemical laboratory the centimetre and gramme are already in universal use. In the mining community the kilogramme can be employed for measuring articles of food, and the litre for the, shall we say, tea, while the kilometre will do admirably for the films at the cinema show.

If the adoption of the metric system is considered too revolutionary for the English-speaking nations, or if the present is not suitable for conducting the agitation in its favor, mining men can at any rate set their house in order by simplifying as far as possible the present system and by agreeing on a common usage. Serious difficulties, however, arise in organizing the standards within the profession for we as a body cannot alter the legal status of the various weights and measures, and our standards must necessarily come into conflict with the official methods and records. The first unit requiring reform or definition, namely, the ton, exemplifies this difficulty. The long ton is the legal measure in Great Britain and the Over-seas Dominions, and the official records are in terms of the long ton. Not long ago we printed a contribution from one of the Australasian Inspectors of Mines, in which he inveighed in no measured terms against the introduction of the short ton into the mine records and demonstrated the resulting confusion. In the United States the short ton is the legal measure, and as it is the older and more logical unit, it commands respect. It has been adopted at most mines controlled by English or American companies for their reports on ore mined or developed, and in spite of the confusion indicated and other disadvantages, we believe the best interests of the mining engineer will be served by its general adoption for this purpose.

Official mining regulations are not, however, the only difficulties to be encountered, for the Metal Exchange and the buyers of concentrate and the sellers of metal in this country have also to be considered. Concentrate and metal are bought and sold in the United Kingdom on the basis of the long ton, and apparently no combination of mining men is strong enough to force an alteration in the custom. Thus we have the absurdity of a Transvaal tin mine reporting ore raised in short tons and concentrate produced in long tons.

The discrepancies between various tons is not, however, confined to legal and business circles, for among mining men a large margin of

difference is also often caused by the neglect to allow for moisture in the ore delivered to the mill. Ore in place is assayed dry, but in a wet mine, or in one where holes and broken ore are liberally watered, the broken ore is weighed wet, and unless due allowance is made for moisture, the mine tons and the tons delivered to the breakers or stamps will not agree. The amount of moisture varies widely from nothing at all in a dry mine, where no dust settling is practiced, to 10 per cent. where the ore is soft and friable and the mine is wet. Thus the returns of content and yield per ton may contain discrepancies as great as those caused by the failure to specify the ton used. It is desirable that all mine reports should take moisture into consideration as well as indicate the long, short, or metric ton. Some of the English companies introduce complications by giving returns in different parts of their reports on varying bases. The directors may employ wet short tons in their report, but the consulting engineers in their analytical tables may recalculate the figures to dry metric tons, and the two statements when put side by side require some explanation. If, as sometimes happens, the two statements do not cover the same items, and one supplies what the other lacks, the inconvenience to the reader is considerable.

After the ton, comes the gallon. Here again the American practice is of older date than that at present current in England, for the United States gallon of 231 cu. in. is the old English wine gallon as fixed in the seventeenth century, while the Imperial gallon dates from the days of George IV. The reformed English gallon affords an example of the endeavor made in this country to correlate the units of weight and capacity, for it was fixed so that a gallon of water should weigh 10 lb., and so be based on the identity of the fluid ounce of water and the ounce by weight. In the reports on the production of petroleum, much confusion is caused by the difference between the English and American gallons, and as there is no present hope of unifying international usage, it is necessary that all reports should carefully specify the unit. It is interesting to note that the old wine gallon survives in this country in connection with the brine wells of Cheshire, and without knowledge of this fact errors easily creep into calculations relating to English salt production.

Slowly the units of weights and measures throughout the British Empire and its dependencies are being regularized, in most cases gradually, so that native susceptibilities shall not be too rudely shaken. For instance, in the Malay Peninsula the native kati and picul have been modified and standardized, so as to have a direct relation to English weights. But because the native customs are respected, English mining engineers do not need to use these weights when reporting on tin mines in Perak to English shareholders, and for the sake of uniformity, we hope that in future engineers will use pounds per yard for the average content and tons for the total output. In South Africa the so-called Cape foot is slightly longer than the Imperial foot and is a survival of the original Dutch occupancy of the Cape of Good Hope. As all other weights and measures in South Africa are identical with Imperial standards, we may expect the linear and areal units to be altered eventually.

We would say a word also to some of our friends operating in Russia, advising their adoption of English weights and measures instead of sagenes, funts, and poods. It is true that English engineers should have some respect for the sagene, for it was regularized in 1833

to measure exactly 7 ft., but as the metric system was legalized in the Russian Empire in 1900, we may take it that the old standards will be abolished in time, so that there is no object in preserving the Russian measures in reports of English companies. In any case, English investors are not expected to be experts in Russian tables, and it would be more straightforward to employ the units that the intended readers are most likely to understand. Then again, much confusion is unnecessarily introduced into reports on South American properties by the use of local weights and measures. For instance in Bolivia there are three different quintals, and unless a definite statement accompanies a report, misleading deductions may be made. We would take this opportunity of reminding engineers that though many different systems of weights and measures are extant in Mexico and South America, only the metric system is recognized legally, so that it is highly necessary that all contracts should conform to the regulations. Not only this, but by so doing endless confusion will be avoided.

Many more examples could be given with the object of illustrating our argument in favor of lucidity and simplicity. We may suitably sum up our views by advising engineers to use the metric system wherever possible, and always to champion it; to use the simplest of English weights and measures, and in cases of uncertainty to specify the unit; to avoid, when addressing an English audience, the use of weights and measures not likely to be understood.

Standard Screens.—At the present time, American mining engineers and metallurgists are keenly discussing the standardization of technical terms. The preliminary report of the Mining and Metallurgical Society contains similar recommendations to those forming the subject of a recent paper presented to the Institute of Mining Engineers and it is right to assume therefore that mining men in America are practically unanimous in their views on the subject. The two societies are to be congratulated on their emancipation from the slavery of the old idea that the width of hole has to be the same as the diameter of the wire. The Institution of Mining and Metallurgy, the Mines Trials Committee of the Witwatersrand, and even Mr. Theodore Hoover designed their series of screens on that basis. The reason for its adoption was that the relation between the number of holes per linear inch and the width of the hole is easily deducible. But against the convenience thus gained many disadvantages arise. For one thing the effective area of the screen is only 25%, that is to say the holes occupy only a quarter of the total area. Under such conditions the time occupied in the sizing operation is obviously longer than if the wires were proportionally narrower. Not only is time lost, but the necessary continued sieving action is apt to grind the particles still further, and so to give an incorrect result. A second objection lies in the fact that with wide wires the depth of the hole is unduly great and offers more opportunity for particles to jam and clog the screen. For both these reasons the wires are subjected to a greater amount of wear, and they must be replaced oftener in order that the apertures shall not become too big. Moreover, the closer the wires the greater the degree of crimping required, and the greater variation in the shape of the hole when seen from different angles. From all these points of view it is clear that the finer the wire the better, and the limit of fineness depends on the strength of the metal used in their construction. The actual design of a series

of screens based on this principle must necessarily be left in the hands of an expert in screen-manufacture. Fortunately the American Institute and the Society were relieved of anxiety in this direction by the fact that a firm, the W. S. Tyler Company, of Cleveland, Ohio, already makes a screen of this type.

The other principle adopted by the American Institute and the Society was that the ratio between the sizes of the holes of consecutive members of the series of screens should be uniform. The Rittinger ratio was considered to afford as many screens as are usually required in mining and metallurgical practice. With this ratio, the area of the holes of each screen is double those of the preceding one. The basis of the committee's series is a screen having 200 holes to the inch, each 0.0029 in. wide, with wires 0.0021 in. in diameter. The area of such a hole is 0.00000841 sq. in., and the areas of the holes of the succeeding screens are obtained by successively multiplying by 2. The ratio of the widths of the successive holes is $\sqrt{2}$, or 1.4142. This series of apertures has the support of the United States Bureau of Standards, which adopted it after consultation with several of the big mining companies. To Mr. A. S. Disbro, of the W. S. Tyler Company, is due the credit of arranging the diameter of the wires and the number of holes per linear inch that would correspond most conveniently to the series of apertures.

DETAILS OF PROPOSED SCREENS.

Holes per inch	Width of hole, inch	Diameter of wire, inch	Area of holes, sq. inch	Ratio diameter of wire to width of hole.	Ratio of area of holes to unit of screen area.
				%	%
3	0.263	0.070	0.069	26	62
4	0.185	0.065	0.034	35	54
6	0.131	0.036	0.017	27	61
8	0.093	0.032	0.0086	34	50
10	0.065	0.035	0.0042	55	42
14	0.046	0.025	0.0021	54	39
20	0.0328	0.0172	0.00108	52	43
28	0.0232	0.0125	0.00054	54	42
35	0.0164	0.0122	0.00027	74	32
48	0.0116	0.0092	0.000135	79	31
65	0.0082	0.0072	0.0000672	88	28
100	0.0058	0.0042	0.0000336	72	33
150	0.0041	0.0026	0.0000168	63	37
200	0.0029	0.0021	0.0000084	72	33
		Suggested Alternatives:			
40	0.0164	0.0086	0.00027	51	43
55	0.0116	0.0066	0.000135	57	40
75	0.0082	0.0051	0.0000672	63	38

The accompanying table shows that as the apertures grow larger the diameters of the wire become proportionately less, so that the effective screen area becomes greater. With the smallest holes it is found inadvisable to use very fine wires, as they would hardly be strong enough, and perhaps they would be difficult to crimp so as to hold in position;

but the ratio of wire to hole diminishes as the mesh becomes coarser, and the effective screen area increases. There are, however, a few vagaries in the table, to which the attention of the two societies may be drawn. The wires used in the 35, 48, and 65 meshes are unnecessarily thick, and the effective screen area is accordingly diminished. If in these screens 40, 55, and 75 holes were made per inch, with of course the same width of aperture, a smaller wire would be required and the effective area brought more into line with the others, as given in the alternative three lines at the bottom of the table. In the 10-mesh and 14-mesh also, wires are employed that are thicker than called for, but of course 10 is a figure whose usefulness cannot be ignored. In connection with the table it would be desirable to recalculate the figures giving the areas and apertures, carrying the figures for the areas to eight places of decimals, beginning with 0.00000841 instead of 0.0000084, and those for the width of the holes to four places of decimals. As the table stands, cumulative errors may readily arise in calculations. With the more complete figures it would be easier to deduce the convenient diameters for the individual wires.

In discussing the minutiæ of the construction of the screens, much depends on whether the screens are intended for careful laboratory investigations or for the rough-and-tumble life of the average mill. With coarse-crushing machines, screens are used, but in re-grinding and all-sliming such a method is inadvisable, and the operations of the machines are regulated by screen tests. Thus the members of a series of screens may have two different applications, and the overlapping of the two uses is not always easy to determine. For tests a thinner wire would be permissible, but in a machine more strength would be required, and a series of screens intended for both purposes would have to sacrifice a high ratio of effective area for greater strength of construction.

The advantages gained by having a series of screens with apertures the area of which increases in multiples of two are not clear. Rittinger adopted this system because he considered that the amount of energy expended in comminuting rock or ore was inversely proportional to the area of the holes through which they would pass. On the other hand Mr. Theodore Hoover holds that the energy expended is inversely as the size of the particles, so that according to the same plan the widths of the holes of successive screens should increase with the cube root of two, that is in the proportion of $\sqrt[3]{2}$: 1. Mr. Hoover's series contains a greater number of screens than the series based on the square root of two, and he urged that in experiments relating to flotation a closer classification was required than is possible on Rittinger's method. We confess that these scientific bases for a series of screens do not appeal to us strongly, for sizing is only a convention and not an exact science. For instance, the aperture is a square, and the mesh is calculated on its width, but particles of larger size pass through on the diagonal. As regards the size being a measure of the work done, we have to remember that the shape of the particles varies in every possible way, and that the constituents of a rock behave differently in the crushing apparatus. When the valuable part and the gangue crush to entirely different shapes, in needles, flakes, or cubes, the sizing results will not always give a true interpretation of the nature of the ore. Also the sizing of heavy sulphide and light gangue by means of screens does not give the ideal separation for purposes of concentration or

metallurgical treatment, and in this connection a combination of sizing by screen and classifying by settlement as exemplified by Professor G. H. Stanley's apparatus deserves attention. But when working with screens alone we do not see that any ratio of theoretical interest is any more helpful than a ratio based on linear measurement. However, it is not desirable on this occasion to enlarge on the theory of work done, or to join in the Kick-Rittinger discussion. The question of ratio is as nothing compared with that of the proportionately wider aperture. We recognize the great value of the series of screens using as large an effective area as possible, and for this reason the proposed American standards deserve the most friendly consideration.

EDUCATION OF MINING ENGINEERS.

A. L. Walker.—We have heard from many quarters that the profession of mining engineering is on the wane, and that the practice of the consulting mining engineer is almost dead in many centers. This is a matter of great importance, and it seems to me a fit topic for discussion by this Society. I therefore beg to bring the subject to your attention, hoping that it may be considered at some of our meetings.

The engineering profession as a whole has changed greatly in the past half century, especially in this country. For a long time the civil engineer was supposed to be able to handle everything pertaining to engineering. Then came the mining engineer, whose special field was in the exploitation of the mineral wealth of the world, and as Rickard has truly said, the mining engineer has played the role of a pioneer of civilization. In former years he was his own metallurgist, mechanical engineer and electrical engineer. Lately, however, the engineering profession has become so specialized that we now find it necessary not only to have civil engineers and mining engineers, but also metallurgical, mechanical and electrical engineers, and last, but not least, chemical engineers. In fact, engineering is divided into more distinct branches than is the case in any other professional work. As a result, at the present time the man trained in mining engineering is no longer called upon to enter other engineering fields, as was frequently the case in former years. It is also impossible for him to know all that should be known in the other engineering branches; hence, when considering work outside of his own profession, he calls for the services of special engineers. Therefore, only those who intend to follow mining engineering take up this work and follow it through. Men intending to enter other branches will study other courses in our engineering schools. This may not necessarily mean there will be fewer mining engineers following the profession.

It must be admitted that the mining engineering field has been considerably upset in the last few years, and the disturbance has been felt in this country especially on account of the conditions that have existed in Mexico. Mexico has been one of the largest fields for our mining engineers, and the shutting off of opportunities there has been felt greatly by the profession. More recently, the tremendous conflict taking place in a large part of the civilized world is also having an effect on the mining engineering profession, in spite of the fact that in this country our metal mines are producing more ore than ever, and our metallurgical plants are turning out more metal.

The work of the mining engineer is not greatly enlarged by the increased output of a well organized mining property. His chief duties lie in the exploitation, development, and organization of mines, and this field has been sadly lacking in the past few years. This condition, of course, is only temporary, and when the situation changes, and the world resumes its normal condition, the field for the mining engineer will undoubtedly be as great, or even greater, than ever before, especially for the young operating and consulting mining engineers of this country, on account of the unfortunate fact that so many of the young engineers of other countries are being killed that the demand for engineering talent from this country will be even greater than ever.

In connection with all this, the question of the technical training of mining engineers and metallurgists might be considered. Somewhat over fifty years ago, when the first school of mines was started in this country, the amount of instruction given was limited, and was much less than it is necessary to give today, owing to the vast progress which has been made in engineering. It would be impossible today to teach all the subjects necessary for a young engineer to know in the same space of time as formerly. In recent years many mining schools have been started all over the country, and all of them have been attempting to educate mining and metallurgical engineers in a four years' course of study. As a result, some branches are overlooked, or touched on to such a limited extent that the education of the engineer is inadequate. In some schools it has been found necessary to increase the number of years required for instruction, or greatly to increase the requirements for admission, in order to give the students not only the instruction in the requisite engineering and technical subjects, but also a suffi-

cient amount of the so-called "humanities," to insure a proper education, and an engineer should surely be a well educated man. At the Columbia School of Mines, it has been thought advisable to meet the conditions of the present time by increasing the requirements so that, to enter the School, a man will have had the equivalent of three years at college in the scientific department, where he receives his general education. This will be followed by the three years of strictly technical work in the engineering school. Six years seems a long time to devote to study, but it is no longer, in proportion to the amount which must be learned at the present time in engineering subjects, than four years was, fifty years ago. Many schools will continue to work on a four-year basis, but it is believed there is a demand in this world for young engineers who have been educated to a higher degree than is possible in a four-year course.

The technical training of young men is an important and extremely difficult proposition; and after leaving college, what should the young graduate attempt? We hear many diverse opinions on these questions; and in connection with any discussion which may take place in regard to the future of the mining engineering profession, it might be well to consider what qualifications are best for the men who are going to enter this profession.

The question may be summarized in the following manner:

1. Is it best for mining engineers to be educated men, and will not an educated engineer have a distinct advantage?

2. Should the engineering training be entirely theoretical; should practical instruction predominate, or is it not best to arrange for just enough practical instruction to illustrate the fundamental engineering principles on which practice is based?

3. What is the field for the young graduate? Should he perform manual labor in mines in order to learn practical mining, or can he learn this by careful observation while occupying minor positions. How long should the average graduate occupy minor positions with small salary before he is capable of assuming responsibility?

4. To what extent is it possible for large mining companies in this country to arrange for the systematic practical training of young engineers?

I hope these and many other questions will be considered so that the engineering schools may have the benefit of the opinions of practicing engineers.

F. F. Sharpless.—I take pleasure in bringing this courteous letter to the attention of the Society:

Douglas, Ariz., Oct. 20, 1915.

To the Secretary, Mining & Metallurgical Society of America.

Dear Sir:

The Douglas Chamber of Commerce and Mines desires to enter into reciprocal relations with your organization for our mutual benefit.

As there is a good deal of travel throughout the entire year, it will doubtless be a matter of interest for your members, as well as for our own, to know that they will be welcome on making themselves known by presenting a membership card.

We occupy a suite of offices in the Gadsden Hotel Building, located in the business center of the City of Douglas.

We shall be only too glad to receive your members here, and extend to them the usual courtesies.

I trust we may have an acknowledgment of this letter and that it will be your pleasure to co-operate with us in reciprocal relations.

Yours very truly,

OSCAR K. GROLL, *Secretary.*

COUNCIL

Meeting of Dec. 23, 1915.

A meeting of the Council was held Dec. 23, 1915, in the office of Mr. J. Parke Channing, 61 Broadway, New York City. The meeting was an extraordinary one, called by the President for reasons of weight, without notice to out of town members of the Council. Those present were Messrs. Ingalls, Channing, Stone, Finlay, Dwight and Sharpless; Messrs. Kirby and Huntoon were present by invitation.

The President stated that the primary object of the meeting was for the purpose of acting upon the sixth resolution adopted at the convention held in Washington on Dec. 16th, 1915. That resolution reads as follows:

6. That this conference expresses itself in favor of the creation of a permanent Committee on Mining Law Revision, such Committee to consist of five members from the Mining and Metallurgical Society of America, five from the American Institute of Mining Engineers, and five from the American Mining Congress, and be appointed by these organizations. Such Committee to have the power to select its own Chairman and Secretary and to add to its membership not to exceed ten additional mining men or others interested in the subject for which the Committee is created. The work of this Committee shall be to further the interests of the mining industry through Congressional action in accordance with the resolutions adopted at this conference; and its joint report shall be presented to each of the Societies formally represented in its make-up.

It was moved and carried to appoint a committee of five

members of the Mining and Metallurgical Society to co-operate with similar appointees from the other Societies named. The President, with the advice of councillors present, appointed the following named members to act for this Society: Messrs. H. V. Winchell, J. P. Channing, M. L. Requa, R. A. Parker, and S. W. Mudd.

The Secretary informed the Council that the American Mining Congress had appointed the following named persons to represent that association: E. B. Kirby, G. E. Collins, W. L. Clark, George Wingfield, and T. S. Robinson. Those appointed to represent the American Institute of Mining Engineers were J. R. Finlay, D. C. Jackling, Hennen Jennings, C. F. Kelley, and E. B. Kirby.

The Secretary read the following letter from George S. Rice relating to the Joseph A. Holmes memorial:

Washington, Dec. 18, 1915.

F. F. Sharpless, Secretary.
Dear Sir:

An informal meeting, Mr. Hennen Jennings presiding, was recently held in Washington, of representatives of the American Institute of Mining Engineers and of the American Mining Congress to determine what might be done to honor the memory of the late director of the United States Bureau of Mines, Dr. Joseph A. Holmes. The undersigned, who was appointed temporary secretary, was instructed to send invitations to other national societies and bodies which were interested directly or indirectly with the safety and welfare of mining and metallurgical workers, or in scientific investigations, to send representatives to a formal meeting to be held Saturday, Jan. 15, 1916, in the Bureau of Mines building, Washington, D. C. A list is appended of the various national bodies who have been invited to be represented.

In addition to planning a permanent organization there will come before this meeting numerous plans which have been suggested looking to the perpetuation of the memory of Dr. Holmes and with a special view to furthering the ideals which he advanced for the increased safety of the miners and metallurgical workers and the conservation of the mineral and other natural resources of the United States.

An early reply will be appreciated.

Very sincerely yours,

GEORGE S. RICE.

LIST OF ORGANIZATIONS.

1. American Institute of Mining Engineers.
2. The American Mining Congress.
3. The American Federation of Labor.
4. United Mine Workers of America.
5. The Mining and Metallurgical Society of America.
6. American Society of Mechanical Engineers.
7. American Institute of Electrical Engineers.
8. American Electro-Chemical Society.
9. American Institute of Chemical Engineers.

10. National Safety Council.
11. American Society of Civil Engineers.
12. American Chemical Society.
13. Geological Society of America.
14. American Forestry Association.
15. Natural Gas Association of America.
16. American Association for the Advancement of Science.
17. National Academy of Science.
18. American Red Cross Society.

On motion, duly seconded, Dr. George Otis Smith was appointed a committee of one to attend the meeting on Jan. 15, to represent this Society.

Under date of Nov. 29, the Secretary sent to all members of the Council the following letter:

November 29, 1915.

To the Members of the Council of the Mining and Metallurgical Society of America.

Dear Sirs:

The Secretary has been asked to place the following matter before the Council:

In connection with the election of Secretary-Treasurer for the coming year, and the provision of a suitable office for the Mining and Metallurgical Society, the attention of the Secretary has been drawn to the fact that many New York members are spending but little time in the City, and that many members whose permanent addresses are outside of New York are often here on business and have need of office accommodations. Would it be practicable to rent for the use of the Society and the Secretary an office of rather larger size than would be normally required by that officer, and furnish desk room for such of our members as have but limited use for an office in New York. This plan would contemplate giving the member not only desk room but a permanent office with his name on the register of the building, telephone number, the services of a stenographer, care of mail and telegrams, and all of the usual accommodations, at rates that would be mutually helpful to the member and to the Society.

This matter will be brought up at the next Council meeting, and the undersigned would be glad to receive and present the views of those Councillors who do not expect to be present.

F. F. SHARPLESS, *Secretary.*

The Secretary stated that a number of replies had been received from Councillors endorsing this idea. A further discussion now took place, as a result of which the Secretary was authorized to lease accommodations for carrying out this idea, the rent not to exceed $600 per year, which rent is to be a portion of the $1,500 allowed for secretarial purposes by vote of the Council, Oct. 27, 1914.

The Secretary was instructed to publish an announcement in the bulletin for February, 1916, explaining to members what it

was proposed to do, and asking for their suggestions toward making the office of the Society as useful as possible to the entire membership of the Society.

The ballots of the Council on award of the annual medal having all been returned, they were ordered canvassed. As a result of the scrutiny the President announced that the majority of the votes were in favor of awarding the medal for the year 1916 to Prof. James F. Kemp, for distinguished service in the advancement of the science of economic geology.

The Secretary was authorized to publish the entire proceedings of the Washington meeting of Dec. 16 in the December bulletin of the Society.

Meeting of January 11, 1916.

The meeting was called to order by the President, Mr. Ingalls, immediately after the adjournment of the first session of the annual meeting.

The following letter from the Institution of Mining & Metallurgy on the subject of Standardization was read:

December 23, 1915.

The Secretary, Mining and Metallurgical Society of America.

Dear Sir:

At a recent meeting of our Council the report of your standardization committee was submitted and some discussion arose on the recommendation of the committee in regard to standard laboratory screens.

The Council greatly regrets that your committee has felt it necessary to recommend standards entirely different from the I. M. M. standard laboratory screens, which were adopted by the Institution after extended discussion and after communicating twice with some 2,000 mining engineers in all parts of the world.

Owing to the conditions imposed by the war, it is impossible to obtain the considered views of the members of this Institution in regard to the recommendations of your committee, and our Council ventures to hope that, if possible, your Society will postpone final decision until after the war, so that the subject may again be fully discussed.

I send you under separate cover three copies of a letter on the subject contributed by Mr. Walter McDermott to the December issue of *The Mining Magazine*, in which he deals with some of the considerations affecting the question.

I greatly regret the unavoidable delay in bringing your letter of July 28 last under the consideration of our Council, but I feel sure you will readily understand that the time and energies of the Council and officers of the Institution have been more than fully occupied with work of an urgent character connected with the war.

Yours faithfully,

C. McDermid, *Secretary.*

Upon motion, duly seconded and unanimously carried, the Secretary was instructed to inform the Secretary of the I. M. M. that the Council of the Mining and Metallurgical Society deeply appreciates the interest shown by the Council of the I. M. M. in the preliminary report of our Committee on Standardization, and the Secretary of the Mining and Metallurgical Society was instructed to advise the Secretary of the I. M. M. that, agreeable to the request of the Council of that body, no final action would be taken by this Society in respect to standardization until there had been ample opportunity for full exchange of ideas in respect to any points wherein our committee took exception to the standards of the I. M. M.

The following letter from the Canadian Mining Institute was then read:

Jan. 8, 1916.

The Secretary, Mining and Metallurgical Society of America.
Dear Sir:

The next annual meeting of our Institute is to be held at Ottawa on March 1, 2, and 3 next. It would give our members great pleasure if you would afford them the opportunity of meeting you on that occasion by attending the meeting. We should particularly like to hear from you concerning the work your Society has undertaken in connection with standardization, and also to discuss with you means by which our Institute can co-operate with your Society in this and other respects.

H. MORTIMER LAMB, *Secretary.*

Upon motion, duly seconded and unanimously carried, the Secretary was instructed to advise the Secretary of the C. M. I. that one or more delegates would be appointed to attend the annual meeting of the Institute, and that these delegates would be instructed to discuss with that body such matters as both associations are interested in, with the idea of securing co-operation to the fullest extent possible.

The President announced the recipient of the annual medal and advised that the arrangements for the presentation of the medal be deferred until the Society should learn when it would be convenient for Prof. Kemp to be present.

The Secretary read a list of those who were in arrears for annual dues. It was moved and seconded that any members who were engaged in the field of war on either side, should be released from paying dues until the war was over. It was not deemed necessary for the Council to take action on any of those members at present in arrears.

The Secretary advised that 10,000 copies of the proceedings of the convention at Washington had been printed as a Senate document, at the request of Senator Smoot, and that a number of these would be available for the Society within a short time.

F. F. SHARPLESS, *Secretary.*

ANNUAL MEETING.

AFTERNOON SESSION.

The seventh annual meeting of the Society was held at the Engineers' Club, New York City, Jan. 11, 1916. The President, W. R. Ingall, called the first session to order at 2.30 p. m.

The members present were Messrs. Ingalls, Kirby, Penrose, Huntoon, Stone, Spilsbury, Stoughton, Finlay, Finch, A. H. Rogers, Westervelt, Munroe, Dwight, Channing, Mein, Clements, Liddell, and Sharpless. In addition to the foregoing members present in person 26 proxies were held by Mr. Ingalls, 23 by Mr. Channing, 18 by Mr. Finlay, 2 by Mr. Huntoon, 7 by Mr. Stone, 5 by Mr. Dwight and 56 by Mr. Sharpless. A quorum being present, business was taken up.

The minutes of the previous meeting, Jan. 12, 1915, having been published in bulletin No. 80, and distributed to all members, and no corrections being offered, were approved as distributed.

Officers Elected for 1916.

The chairman called for the report of the tellers, Messrs. Liddell and Kirby, who had been appointed to canvass the ballots for officers for the year 1916. The report of the tellers having been formally accepted, the chairman declared the following officers elected for the year 1916: President, J. R. Finlay, 52 William St., N. Y.; Secretary, L. D. Huntoon, 115 Broadway, N. Y.; Councillor, District 1-2-3-4, W. R. Ingalls; Councillor, District 5-6, R. A. F. Penrose; Councillor, District 9-10, C. W. Merrill; Councillor, District 11, S. W. Mudd; Councillor, District 12, C. W. Goodale.

The chairman then announced that the annual gold medal of the Society had been awarded to Professor James F. Kemp, in recognition of his distinguished service in the advancement of the science of economic geology.

The report of the Secretary of the Society for the year 1915 was read and approved. This report is as follows.

Report of the Secretary.

Membership.—The Society has experienced a slight growth during the year 1915, the net increase in membership for the year being ten. Considering the number of engineers who have been idle or have had little to do during this period, the increase may be considered as satisfactory. There were eight resignations, nearly all of which were caused by the necessity of retrenching obligations through non-employment. Dues payable, $160, also points to the fact that some members have felt hard times and yet have not felt like resigning, hoping soon to be able to liquidate their obligations. The council has appreciated the circumstances and has exercised its prerogative in not dropping such members as they felt should be carried temporarily.

The gain in membership has not been so great as the Secretary hoped for, nor is so large an income received as could be used advantageously by the Society. Such increase as has been secured to the membership has come through the suggestions of a very few members to possible applicants and from applications received without suggestion. In order to increase the usefulness of the Society, more funds should be available, and those members who have the interest of this organization at heart would do well if they would remind their friends, who are available for membership, of the work that we are trying to do.

On several occasions, when possible applicants for membership have had the matter under advisement, they have asked what benefit was to be derived from membership in the Society. Such benefits as the Society can offer are known to all of the members and need not be repeated here; but the point that is overlooked, and the question that it would be most pertinent for the applicant to ask, would be, "How can I help the mining industry by joining the Mining and Metallurgical Society?"

If those of our members, who, from time to time, invite their friends to join our organization, would dwell upon the fact that this organization has been and still may be used for the benefit of the profession, and the business with which it deals, rather than attempt to show the new member how he will get $10 worth of benefit from membership, I believe that more applications would be filed. The direct benefits that each member receives will not often be worth $10, but the good that may be done by united action may far exceed in value our annual contributions.

	1914	1915
Total membership, Jan. 1	237	261
Members elected	34	24
Died	3	4
Resigned	7	8
Dropped for non-payment of dues	0	2
Gain in year	24	10
Total membership, Dec. 31	261	271
Candidates before the Society	0	4
Candidates before the Council	2	2
Applications pending	10	7

The Society has lost through death this year four members: Frank A. Hill, Theo. B. Comstock, Franklin Guiterman, and Dr. Joseph A. Holmes. The loss of Mr. Guiterman and Dr. Holmes is particularly felt, for both took an active interest in the affairs of the Society and, like busy men that they were, often found time to assist in its activities.

Meetings of the Society.—Three meetings of the Society were held during the year: the annual meeting in January, the meeting at which the annual medal was presented to Professor Robert H. Richards, and the meeting at Washington, Dec. 16, devoted to the subject of mining law revision.

Meetings of Sections.—The New York section held regular monthly meetings throughout the season. These were well attended by New York and out of town members. Several very interesting papers were presented, the demand for which necessitated an increase in the number of bulletins published.

Among those papers for which there has been a particular demand were: "Possible Application of Oxygen to the Metallurgy of Iron" by J. E. Johnson, Jr.; "Sources of Potash in the United States," by A. H. Rogers; and "Industrial Energy as a Military Weapon," by J. R. Finlay. That the meetings have been thoroughly enjoyed is evidenced by the continued large attendance.

The San Francisco Section held but one meeting, at which the report of the Committee on Standardization was fully and critically discussed.

Committees.—The Committee on Mining Law made a report early in the year and urged the Council to take steps toward placing the matter of mining law revision before the 64th Session of Congress with more force than had been previously used. It was suggested that all mining associations be urged to co-

operate, and that mining companies be asked to join with the Society in its work. This program was carried out by the Council, and the results of their efforts and those of the Mining Law Committee are fully set forth in the December bulletin of 1915.

The Committee on Standardization made a preliminary report, which has been commented upon by a large number of members and by the San Francisco section. On account of the December meeting of the Society coming at a time when the New York section usually holds its meetings, this section has not been able to give the subject the consideration that it demands. At an early date it is expected to take up the report of this committee at a meeting of the New York section, immediately after which all discussion will be referred back to the committee for consideration. Other committees have reported progress and have been continued.

Annual Medal.—The annual medal for 1915 was presented to Robert H. Richards, on March 18, at the Chemists' Club. About 75 members and guests gathered on that evening to pay their respects to Professor Richards, and after dinner listened to a number of well merited tributes addressed to the Professor.

In passing, it might be mentioned that the method now adopted for selecting the subject for the award, and its recipient, works quite well, but even with this system it is by no means an easy task for the Council to make a decision which shall represent the views of a majority of the members of the Society.

Future of the Society.—At the time the Society was formed there were a number of live questions before the mining engineers of this country, many of whom felt that these questions might be discussed and conclusions reached through an organization of this kind.

As these matters have from time to time been discussed and disposed of in one way or another, the interest of some of the charter members has slackened or lapsed, and they have asked why the Society should be continued, or have resigned. If the functions of the Society are to be purely social, while its bulletin is the means of publishing only an occasional paper of interest, then its years of life are numbered and they are not many; but, as pointed out in a previous paragraph, and in our constitution, Article 2, the object of the Society shall be for conservation of our mineral resources, the advancement of mining and metal-

lurgical industries, the better protection of mine investors and operators; in short, to further the advancement of the mining business in every way possible.

This field is broad; there is plenty of work remaining to be done. No other organization is so constituted that it can or will do it. There is no reason for folding our hands and feeling satisfied with ourselves for having finished our work. But there is every reason for feeling encouraged by what we have accomplished and this should be a stimulus for further effort.

In closing my report, let me suggest, for the benefit of members and the secretaries who are to come, that every member do his utmost to place before the Secretary and the Council such ideas as he may have in respect to the needs of the mining business. No one man or small body of men can be expected to initiate all of our activities and keep interest aroused. We all have ideas; many of us look upon problems from different angles; many of us do not know the problems of our associates. Let us all suggest when we can and about what we can, and the Society will continue to be one of the most useful organizations among engineers.

F. F. SHARPLESS, *Secretary.*

The report of the Treasurer was then read, and, after the auditor had made his report, both were approved. These reports follow:

Report of the Treasurer.

The following report for 1915 is respectfully submitted:

RECEIPTS.

Cash in bank, Jan. 1, 1915		$1,202.68
Petty cash on hand, Jan. 1, 1915		1.14
Annual dues, 1912	$10	
Annual dues, 1913	40	
Annual dues, 1914	90	
Annual dues, 1915	2,565	
Annual dues, 1916	40	
		2,745.00
Medal presentation dinner		170.10
Exchange		.20
Binding bulletins and sale of bound volumes		269.10
Interest		145.70
Life membership		100.00
Sale of office furniture		12.00
Subscription		2.00
		$4,647.92

EXPENDITURES.

Interest	$5.74
Printing of bulletins, lists, etc.	836.61
Office rent and stenographer	650.09
Postage, express, telegraph and messenger service	266.19
Stationery and office supplies	132.65
Binding of bulletins	161.88
Bank exchange	7.18
Annual medal and presentation dinner	352.55
Editing bulletin	120.00
Auditing and salaries	30.00
Expenses, Washington meeting, Dec. 16	331.03
Investments	1,127.75
Petty cash on hand	14.56
Cash in bank, Jan. 1, 1916	611.69
	$4,647.92

Assets and liabilities on Jan. 1, 1916, were as follows:

ASSETS.

Badge at Tiffany's	$5.00
Cash in bank and on hand, Jan. 1, 1916	626.25
Bound volumes unsold	7.50
Dues payable*	160.00
Chicago Milwaukee & St. Paul bonds	1,990.00
Penn. Railroad General 4½% bond	980.00
New York City 4¼% bond	147.75
Interest due on bonds	45.00
	$3,961.50

*1913, $10; 1914, $60; 1915, $90.

LIABILITIES.

Payments for life membership	$150.00
Payments in advance for annual dues	40.00
Payments in advance for bound volumes	167.47
December bulletin (estimated)	250.00
December expenses (estimated)	100.00
	$705.47

Assets and liabilities in 1911, 1912, 1913, 1914 and 1915 were as follows:

	Assets	Liabilities	Difference
1911	$1,829.41	$72.50	$1,756.91
1912	2,754.91	148.00	2,606.91
1913	3,147.23	132.00	3,015.23
1914	3,554.07	196.00	3,358.07
1915	3,961.50	705.47	3,256.03

The increase in liabilities of 1915 over preceding years, amounting to $400, is due to the fact that one life membership,

worth $150, is now carried as one of the liabilities of the Society; also, to the fact that the December bulletin, which is an exceptionally large one, has not yet been paid for, and because in the past some of the December bills have been regarded as current and their sum total was not estimated in advance, as has been done this year.

	Income	Expenses	Excess of Income	Placed in Investments	Total Investments
1908	$945.46	$436.96	$508.50		
1909	1,605.75	1,068.99	536.76		
1910	1,880.49	1,543.97	336.52		
1911	1,871.43	1,508.80	362.63		
1912	2,742.06	2,020.86	721.20		
1913	2,598.00	2,404.79	193.21	$1,990.00	
1914	3,506.25	3,072.39	433.86		
1915	3,444.10	2,893.92	550.18	1,127.75	$3,117.75

The income and expense accounts, as they appear from the foregoing table, show a satisfactory condition, with no notable change from previous years. If, however, the current liabilities are taken into consideration the excess of income over expenditures will drop to a very small margin, leaving practically no gain in the assets of the Society for the year 1915. There is, however, compensation for the depleted or stationary condition of the treasury in a review of the work done by the Society. The condition referred to has been brought about through expenses incurred in connection with the Washington meeting of Dec. 16, 1915. The foregoing accounts show a direct expense in this matter of $331.03. The items of postage, telegrams, messenger service, stationery and office expenses have been increased by reason of the Washington meeting, probably accounting for another $100 of those expenses, while the December bulletin, containing the account of the convention in Washington, will probably cost $250, making the total expense of the Washington meeting about $700.

The bulletins for 1915 cover about 150 pages more than the bulletins for the previous year; this, too, means a considerable additional expenes for printing and distribution.

Under authority of the council, the treasurer invested $980 in a Penn. R. R. General 4½% bond, and $147.75 in a New York City bond, bearing 4¼% interest. The latter investment was made in accordance with by-law No. 4, requiring any money received for life membership to be invested in a special fund.

The total invested funds of the Society, at cost price, now stand at $3,117.75. F. F. SHARPLESS, *Treasurer.*

Report of the Auditor.

Jan. 11, 1916.

To the President and Councillors of the Mining and Metallurgical Society of America.

Gentlemen:—Acting under appointment by the President of the Society, I have audited the accounts and vouchers of the Mining and Metallurgical Society of America for the year 1915, and hereby certify that to the best of my knowledge and belief the statement of receipts and disbursements is correctly set forth, and that the balance sheet presents the true financial condition of the Society. Respectfully,

DONALD M. LIDDELL, *Auditor.*

The President then stated that there were several points, concerning the activities of the Society, upon which the Secretary had not dwelt, which should be called to the attention of the members. He drew particular attention to the meeting of the Second Pan-American Scientific Congress, which was held in Washington in December. The Secretary of State had invited the Mining and Metallurgical Society to send delegates to this convention, and in response to the invitation Messrs. Yeatman, Butters, Channing, George Otis Smith, and Ingalls were appointed, and all attended.

This convention proved to be one of the most important gatherings that has been held in this country for a long time. Many important and valuable papers were presented, bearing upon mining and allied subjects, and deep interest was shown in the communications at all sessions. The number of delegates, interested in mining, from South American countries was small, but the attendance at the meetings was large and enthusiastic, and the object of bringing the North and South into closer relations was accomplished.

The formal action taken by the Congress, which was of greatest importance to the mining fraternity, was the adoption of three resolutions from which much good is expected to result. These resolutions had to do with the following subjects: 1. The adoption of the metric system. 2. The compilation and comparison of the mining laws of all the American countries. 3. The systematizing of mining statistics. Permanent committees were appointed to work upon these subjects and their reports will be issued in due time.

The President then reported on the present status of mining law revision, in which the Society is so vitally interested. Having been in Washington for several days in the early part of January, and having appeared before the House Committee on Mines and Mining, together with Messrs. Channing and Finlay, he had had an opportunity of learning the views of a number of Senators and Congressmen.

Favorable action on the Senate bill by that branch of Congress is assured, but at present there is no assurance of getting favorable action upon the House bill by the committee of the House, and less assurance, consequently, of getting any satisfactory bill through the House. The House committee fully realizes the necessity of making many changes, and no further effort towards demonstrating this necessity is required; but there is strong opposition, within the committee, to the commission idea, and it is probable that if the Senate bill comes to the House in its present form it will be pigeon-holed. It was suggested in the House that a commission might be formed to consist of two Senators, two Representatives, and a member from the Bureau of Mines.

Mr. Channing confirmed Mr. Ingalls' review of the situation, stating that the need of revision required no further demonstration, and pointed out that it was going to be particularly difficult to get any bill through the House, which required an appropriation for salaries or even for expenses.

Mr. Finlay reported that he had formed the same impression as had Messrs. Ingalls and Channing, and he thought that the whole of the House committee realized the necessity of doing something towards new mining legislation.

Mr. Westervelt asked what steps had been taken to secure the co-operation of Representatives from the Eastern States. The President replied that the committee, appointed under resolution No. 6 of the convention at Washington, had for one of its objects the presentation of the matter to Eastern Representatives. He also pointed out that, during the convention, scarcely a word of objection to our general program had been heard from any source. One delegate had offered an objection to allowing any representative of the Department of the Interior to be placed upon the commission, and two or three Representatives drew attention to the fact that it would be far easier to pass definite modifications of laws than to get a commission appointed.

Mr. Channing asked if there was any probability that the Society might be asked to draw a bill. To which question the

President replied that there was such a possibility, and that this or other organizations might present bills, or be asked to present them, and as a consequence, it is possible that some very bad bills will be offered.

Mr. Finch reported that some opinion in the West was opposed to the commission idea, such persons holding that the movement was being engineered entirely by Eastern owners, and that the West had little desire for the changes recommended.

In reference to the offering of a bill by this or any other organization, it was pointed out that the various mining-law committees had taken this suggestion under advisement many times, and had come to the conclusion that the plan was impracticable. To draft a suitable code would cost time and money, and such of our members as have the ability to do this work do not have the time to give to it. The financing would therefore have to be done by private individuals or corporations, and then we should hear louder objections, and more criticism of the "moneyed interests" than at present.

Mr. Kirby stated that the question under consideration was a psychological one; that it would not be difficult to improve the code, that there were ample brains within the Society to do it, but that the adoption of such laws as our Society might draw, would be the difficult point. He also suggested that any alterations which we should make would probably hurt some one, and that such person would probably raise serious objections to our recommendations. He likened the work to an operation, which would be of immense benefit to the individual operated upon, but would draw blood.

The report of Messers. Ingalls, Channing and Finlay, as to the attitude of the Senate and Congress toward mining-law revision, provoked a lengthy discussion as to what the Society should do in the case of certain eventualities; but it was finally the consensus of opinion that for the present we could do no more than await the outcome of the action of Congress upon the bills now before it, and that in any future action the Council should be guided by results accomplished in the 64th Congress.

Mr. Huntoon told the members present that he was trying to arrange for larger accommodations for the Society, where any members could have temporary desk room and office accommodations, and asked that the members offer suggestions which would assist in making the Secretary's office of real benefit to out-of-town members.

The meeting then adjourned until 6:30 p. m.

EVENING SESSION.

The second session of the annual meeting was held in the dining hall of the Engineers' Club where dinner was served at 6:30 p. m. The following members and guests were present:

W. R. Ingalls (H. W. Gepp, guest)
F. F. Sharpless
H. H. Webb
Pope Yeatman
R. M. Catlin
Henry S. Munroe
Arthur S. Dwight
Arthur L. Walker
R. V. Norris
H. H. Knox
P. E. Barbour
D. M. Liddell
E. W. Parker
Howard W. DuBois
J. Morgan Clements
Dr. Otto Sussman
Allen H. Rogers
(E. L. Gruver, guest)
G. M. Colvocoresses
J. W. Finch
H. M. Chance
J. A. Van Mater
E. M. Rogers (J. Rogers, guest)
H. W. Hardinge
John W. Mercer
E. F. Eurich
J. H. Susmann
J. Volney Lewis
W. B. Devereux, Jr.
Edwin S. Berry
G. P. Bartholomew
Eli T. Conner
E. B. Kirby
G. D. Van Arsdale
George F. Milliken
W. L. Saunders
T. H. Leggett (L. Kessler, guest)
Benj. F. Tillson (H. C. Behr, guest)
W. Y. Westervelt
Robert Peele
J. H. Polhemus

After dinner, the President, Mr. Ingalls, addressed the meeting, concerning the progress that has been made towards mining-law revision, and spoke to some extent upon the work accomplished by the Society during the year. He extended his thanks to the Secretary for the work that this office had done for the Society during the year, and, upon motion by Mr. Saunders, duly seconded, the thanks of the Society was also extended to Mr. Sharpless for his labors.

Mr. Leggett, Mr. Catlin, and Mr. Webb were called upon in rotation, and each spoke for about half an hour, recalling some of the interesting incidents of their early South African experiences. These remarks were deeply interesting and were thoroughly enjoyed by those present, but they were entirely personal and, at the request of the speakers, they were not reported for publication.

Mr. H. W. Gepp, who had recently come from Australia, offered remarks concerning present political conditions throughout the world, drawing particular attention to the Australian view of the United States neutrality toward the present war.

F. F. SHARPLESS, *Secretary.*

MEETINGS OF SECTIONS.

SAN FRANCISCO.

The San Francisco section met at the Engineers' Club, 61 Post Street, on Nov. 23, 1915. The members present were: E. H. Benjamin, C. C. Brayton, S. E. Bretherton, G. H. Clevenger, E. A. Hersam, A. C. Lawson, T. H. Leggett, C. W. McMeekin, C. W. Merrill, E. H. Nutter, W. H. Shockley and H. W. Turner. The guests present were: H. W. Gepp and T. A. Rickard. A. C. Lawson acted as chairman; W. H. Shockley, as secretary.

After dinner, the report of the Committee on Standardization, in bulletin 87, was considered. The meeting found that the use of figures for both sections and paragraphs was confusing, and requested that, in future publications, figures be employed for sections and letters for the paragraphs.

1. *Ore in Sight.*—Mr. Turner stated that, as an engineer must explain his method of arriving at results and hence must define the terms used, he saw no objection to his using any words he chose. The meaning attached to any special phrase depended largely on the character of the ore deposit to which the report related. An engineer might consider that uniformity in the ore of a pyritic lens was so general that it could be sampled with the diamond drill, while a gold-quartz vein should be exposed by development before correct sampling was possible. He considered it essential that in every report the exact meaning of the terms employed be accurately defined.

Mr. Rickard was opposed to the use of "Ore in Sight," as it was employed by fakers. The term is discredited and it would be well to discard it for good.

Mr. Leggett preferred the use of "Ore Reserves" as a generic term, while "Ore Blocked Out," "Proved Ore," "Partially Developed Ore," etc., would be used as subsidiary headings in a report.

Mr. Merrill moved that the words "or its equivalent" be inserted after "ore in sight," page 190, line 1, and that the section be then adopted. The motion was carried.

Sub-section 2, page 190, was also adopted, after correction of typographical errors, and insertion of "or its equivalent" in line 5.

(Note: The numerous verbal and other changes made were all noted on a marked copy of the bulletin, which was sent to Secretary Sharpless for transmittal to the committee.)

Sub-section 3, page 190, was adopted, after changing "general" to "precise."

Sub-section 4, page 190, was adopted, after eliminating "best," in line 2, and inserting "carelessness" before "dishonesty," in the last line.

2. *Unauthorized Use of Publications.*—Mr. Turner thought that the section, as it stood, was not quite the same as that of the I. M. and M., and read the exact wording of the resolution of the Institution of Mining and Metallurgy, which evidently referred only to the commercial use of the publication.

Mr. Clevenger stated that this section did not debar the use of the publications in scientific articles, but only referred to their misuse for commercial purposes.

Mr. Shockley pointed out that as the publications of the Society are not copyrighted they may be freely used by non-members, while members are hampered.

Messrs. Merrill, Hersam, Rickard, and most of the others present, spoke in condemnation of portions of this section, and, on motion of Mr. Merrill, the paragraphs beginning: "That in connection with, etc.," and "The infraction, etc.," were struck out. Paragraph 4, "The Council, etc.," was edited grammatically, and adopted.

3. *Mesh of Wire Cloth.*—Mr. Clevenger held that the Society should adopt its own screen scale and, whatever it may be, it should be known as the Mining and Metallurgical Society's Standard Screen Scale. In order that users might be assured that they were getting wire cloth that met the Society's requirements, it would be quite proper for the Society, after proper investigation, to endorse the product of all makers who should meet these requirements. It would also follow that, should a maker's product fail at any time to come up to the standard, the Society's endorsement would be withdrawn.

Quite as important as establishing a standard screen scale is the establishment of a standard method of conducting the sizing test. At the present time there is a great variation in the procedure and, even though the same screen scale be used, direct comparisons of the work done at various plants is not possible. This is a matter of a great deal of importance to the mining industry and, therefore, justifies most careful investigation.

In the Bureau of Mines Exposition laboratory, under his

direction, was begun an investigation of various methods of conducting sizing tests, in the hope that both hand and machine methods could be evolved which would give uniform results. Considerable progress has been made in this work and it would therefore seem desirable that the Society work in harmony with the Bureau of Mines upon this particular feature of standardization.

Mr. Hersam objected to the establishment of a single series of screens, maintaining that different series should be used for different purposes. The series based on the square-root of 2 applied specially to velocities of particles settling in water, while a series of screens based on the cube-root of 2 applied better to changes in volume. The correct way to define a mesh is by the diameter of aperture in thousandths of an inch. No. 1 screen would have an aperture of 1/1000 in.; No. 2 screen, 2/1000 in.; and so on; thus No. 93 would have an opening 93/1000 inch. Mr. Hersam promised to amplify his remarks in writing (see below). He also pointed out that the actual fine screens in use showed variations of from 25 to 50% in the size of opening. The best method of illustrating this is to project the image of the mesh by a stereopticon, thus greatly magnifying the errors.

Mr. Clevenger considered that the errors of the best commercial laboratory screens were not as great as stated by Mr. Hersam, and spoke of results of his microscopic examination of screens.

After much further discussion, it was moved by Mr. Hersam, and carried, that the matter of a standard mesh for wire cloth be deferred, and that when standards were established they should be in terms of aperture and preferably in units of thousandths of an inch.

4. *Weights and Measures.*—Mr. Shockley objected to the use of the term "miner's inch" on the ground that it was a local term.

After changing sub-section 4, page 192, to read: "The flow of water shall be expressed in cubic feet per second, and where it is desirable, for local reasons, to use the term 'miner's inch,' it shall represent a flow of 1½ cu. ft. per minute," Mr. Merrill moved that Section 4, page 191, with sub-sections 1 to 7, be adopted with certain verbal changes. The motion was carried.

5. *Bullion and Assay Values.*—Mr. Merrill objected to subsection 1, because when the sample is dried at 100°C., water of crystallization is driven off and thus the sample is enriched, so

that the seller of the ore may lose from 1 to 10%, because the assay sample is dried at a temperature below 100 C., thus leaving water of crystallization in the assay sample. He advised that 90°C. be used instead of 100°C.

Mr. Hersam showed that some minerals give off water of crystallization at a lower temperature than even 90°C., while others require a higher temperature than 100° for proper dessication. On motion of Mr. Hersam, paragraph 1 was struck out.

Messrs. Leggett, Rickard, and others, edited Section 5, sub-sections 2, 3, and 4, to read as follows:

(*b.*) Assay values of gold and silver ore and products shall always be expressed in terms of fine gold and fine silver respectively, and not as "bullion."

(*c.*) Assay values of samples of alluvial deposits shall be reported in cents per cubic yard. (Next following paragraph to be eliminated.)

(*d.*) In reporting assay values of cyanide and other solutions, the results shall be given per short ton of solution. (Next following paragraph adopted without change.)

On motion of Mr. Merrill, Section 5, sub-sections 3 and 4, as edited, were adopted.

On motion of Mr. Merrill, Section 5, sub-section 5, first paragraph, was adopted in the following form. "In stating the contents of an ore, all base metals shall be given in percentages and all precious metals in ounces." It was the sense of the meeting that Section 5, sub-section 5, second paragraph,—"If it becomes necessary to . . . . . realization costs," should be referred to the committee for clarification.

On motion of Mr. Clevenger, Section 5, sub-section 6, page 193, was struck out. On motion of Mr. Leggett, after remarks by other members sub-section 6 was replaced by: "In reference to the above recommendation, it is suggested that local terms be used in addition to standard terms whenever necessary to make the report clear to the engineer's client."

S. E. Bretherton.—I think that at some future meeting the Mining and Metallurgical Society should discuss the advisability of standardizing the methods of reporting the results of both assayers and chemists.

For my part, I think that all assay certificates should report metallic contents only, so as not to mislead the miner and often the promoter who may be willing to be misled. Recently a man came to me, with the best intentions, stating that he had an ore containing nearly 52% antimony and nearly 42% lead. When I questioned such an assay he was quite indigant until I

explained to him that it was practically impossible to have an ore containing such a high percentage of metal as he reported in both antimony and lead.

No doubt many members of our Society have been bothered by men claiming that they had iron ore containing 72 or 73% iron; or sometimes over 80% iron. When questioned, and informed that it is not likely for any miner to have a large body of ore so rich in iron, they are always willing to prove their statements by assay certificates which they hold, until you prove to them that it was iron oxide and not the metal which had been reported. If the assayers would report metallic contents only, and then, for the benefit of their customer, explain under the head of remarks the form in which the metal exists in the ore, it would do away with a lot of confusion.

E. A. Hersam.—It would be unfortunate, at the present advanced time, to undertake to change the long established practices in the use of wire screens, without considering the real cause of the inconvenience we are experiencing, and the need there is of action. A fundamental modification of our system of designating sizes, most of all, is to be desired at this time. The real difficulty that is now being experienced in the use of screens is not so much in arranging sizes according to any series, as in knowing the size of aperture that is actually meant by the number used in designating the screens. A confusion arises from our effort to designate sizes by the number of openings in the linear distance. We make use of such expressions, for example, as "a 30-mesh screen," or "a screen of thirty meshes to the inch," or even, perhaps, "the number 30 screen." Our conception of sizes is now based upon such expressions. The terms are indefinite, however, and must remain always indefinite, on account of the need there is of selecting different sizes or kinds of wire in different cases. The expression of size, moreover, is not direct, when, for the purpose, a denominator is used in which the larger is the opening, and the smaller is the designating number. With coarse screens we do not do this way, and our meaning is there clear. We speak of "a 2-in. screen," or of "screen with 2-in. openings," but do not there think of the screen as being of ½-mesh, nor of the strait into which our designation of fine screens would lead us if thus extended to the coarse sizes. With fine screens we employ a system of description that is directly opposed to this, and the inconsistency results.

There are different points of view to be considered in isolating qualities of screens to be designated, according to the purpose which one has in dealing with screens. Those who use screens strictly for sizing, or for tests upon sizes of materials, are first of all interested to know the size or dimension of apertures. To arrive at this size of aperture the manufacturer is of course concerned in the number of these openings to the running inch. For the operator with screens, however, or for the miner or metallurgist having coarseness of a product in view, the confusion of sizes of openings with the details of wire dimension, and the subtraction necessary to arrive at these sizes, and the division of numbers by a denominator expressing the openings in an inch of distance, is entirely out of place. The only point in question is the size of the opening, all else is encumbrance. The size of this opening, whatever is the size of the wire, will determine the size of the ore particles that will pass through.

There is need of wire cloth of varied strength and endurance to accord with the different uses to which screens are to be put. The use of different metals for the material of the screen, makes it necessary to use also wire differing in size to suit the required strength. For this reason it is not suitable to adopt one size of wire for each size of screen as standard. The designation of a screen by the number of openings to the linear inch does not then provide a working system that is adaptable to the needs. Any system of designation, or any scheme of tabulation based upon representation in meshes to the inch, therefore, will be found always to demand qualifications and explanations, and will be found always indefinite and unsatisfactory.

It would be convenient in every way, and desirable, to number wire screen according to the linear dimension of the aperture in suitable units, either of the English or of the metric system. Our present standards are under the English system, and common agreement appears to have adopted the units of this system for trade and common measurements. Since, too, the unit of the thousandth of the inch is convenient in magnitude for the measurement of fine screen openings, the English system doubtless is to be preferred. Upon this basis, all results of work with screens, all tabulations of their sizes, all designations of any series of screens, and all specifications of screen sizes should be expressed in whole numbers representing the thou-

sandth of the inch, adding, if desired, or if necessary, any needed fraction of the thousandth thereto in the same manner in which use is made of inches and quarter-inches in larger measurements. It is desirable, permanently to discontinue allusion to the number of openings to the inch as an expression of the coarseness of the screen. Allusion to the size of the wire properly should be for reference to the strength, or the wear, or the metal, or the ratio of discharge area to structural substance, but not to the coarseness. The size of the wire which produces the desired size of the aperture is a consideration apart.

A screen having openings 0.050 in. in dimensions, as thus considered, would be one designated by the number 50, this number being the dimension of the opening in standard units commensurate with the magnitude of the openings to be considered. A Tyler screen of eight meshes to the inch, having a diameter of opening of 0.093 in., would then be one designated as of 93 thousandths, and this would be expressed as 93/1000 in. or where thousandths were understood, merely by number 93. Numbers so understood would then be not only adaptable to any desired tabulation, as before, but would have meaning in direct dimensions. With these numbers, and with the variety of screens the trade now supplies, we can secure such a series of screens as may be desired. Our idea of the coarseness of products would rapidly take form in terms of these dimensions.

The arrangement of these screens in the order of a series is a matter in which there should be difference in opinion and requirements. I would desire the series of screens graded according to the square-root of 2, as manufactured by the Tyler Company for certain uses. I would desire screens also graded in another series for other uses. Our system at present is based upon a series arrangement; and this series, which is one of direct gradations in dimensions, is one that possesses many advantages. The series to be chosen depends upon the purpose in the operation. If we are in the habit of designating sizes directly according to the dimensions of the opening, the series which one is to operate with becomes apparent, and selection simple; the screens desired will be forthcoming, and the results that have been obtained with screens in the past, as well as those which we shall obtain in the future, will be always intelligible and useful.

I would point out in this connection that there is an early limit to the refinement to which we can go in arranging screens, and in classifying crushed materials in close sizes with them.

The fourth decimal place in inches exceeds the accuracy of all screens but the finest, and in the best of these the diameters of the openings vary among one another even to extent of some 50 per cent.

The manner of operating screens has not thus far been found entirely practicable for formulation. The angularity of the particles, the varying density, the variability in impact of the screen, and the different mechanisms provided to secure this impact, the load of the screen, the duration, the cohesiveness of the material, and even other mechanical conditions, render standardization difficult and perhaps impossible. The adoption of one type of mechanism, however, is unwisely restrictive for the varied forms that individual preference may justly demand.

The inexactness in the manufacture, combined with the variety of ways of operating and discharging screens, and in addition to these the variety of purposes there are in sizing, each having its claim to a different chosen series of sizes, leads one to judge that it is unwise to adopt any single series as a standard of our Society, but to consider it advisable, rather, to act upon a system of nomenclature or designation by which the thousandth of the inch is made the unit, and by which designation any series of sizes becomes simple.

E. A. Hersam and C. W. Merrill.—The various kinds of mineral substance that may be present in ore lose not only hygroscopic water, but also crystalline or combined water, at various degrees of temperature. The drying temperature of an ore thus depends upon the mineral constituents contained. In many cases, drying at 90°C dehydrates compounds that properly should be considered constituents of the dry ore. Alum, as typical, loses some 15 of its 24 molecules of water slightly above 60°C. A temperature of 100°C. is inadequate to drive away all the water intended to be expelled from coarsely crushed ore of certain kinds. The convenient constant of 100°C. is not a constant of drying conditions when varying barometric pressure and altitude are taken into account. The safer and conservative temperature for drying ore is one lower than 100°C. with the time of drying and the surface exposure properly considered, and made to accord. The actual dehydration cannot be stated to be complete at any reasonable and fixed temperature, when all the components of the ore are not known beforehand. For these reasons, it appears inexpedient to fix the temperature of drying arbitrarily as a standard of our Society.

H. W. Turner.—

2. *Unauthorized Use of Publications.* The Council of the Institution of Mining and Metallurgy, of London, adopted the following:*

That no Member, Associate, or Student of the Institution of Mining and Metallurgy shall make use of the discussions on papers or other subjects at the meetings of the Institution, in prospectuses or any other documents in connection with commercial undertakings, without written authority of the Council, and of each individual speaker or writer concerned previously obtained.

I doubt if it was the intention of the Institution to prevent engineers from using information contained in its Transactions, but rather to prevent the misapplication of such information for commercial purposes, and to prevent the use of the reputation of the Institution for promotion purposes, both of which are eminently desirable.

If, however, we must not use information obtained through membership in a given society, I venture to submit some difficulties.

Most of the members of the Institution of Mining and Metallurgy of London, and of the Mining and Metallurgical Society of America, are graduates of some college or technical school. In these schools, we learn some things of practical value, but the main object of a school training should be to train a student how to learn rather than to cram him with facts. An able student, soon after graduation, becomes aware that he really knows very little, and that he must continue to learn indefinitely if he is to keep up with the march of progress in any line of mining or geological work. To further this end, he usually joins an engineering society, in whose transactions he may expect to find a continuous record of the progress of technical knowledge. We may thus regard the Institution of Mining and Metallurgy and the Mining and Metallurgical Society of America, as well as all other similar societies, as advanced technical schools. That is, as I see it, the main use of technical institutions. We all know that as soon as we cease to learn, we begin to drop back.

Now, if we are unable to make practical use of the information that we acquire from membership in engineering socities, of what use are they to us, apart from the advantage of becoming acquainted with our fellow workers.

Most of us are obliged to make ourselves useful to capital in order to exist; and probably no engineer or geologist will claim that all the information possible to obtain is too great to

*Trans., I. M. & M., Vol. xxiii, p. 535.

solve the various problems arising in the discovery, development, extraction, and reduction of the various mineral deposits, and the placing of the economic product on the market at a commercial profit. We all know that, if we knew more, we could accomplish more for our clients. Therefore, it seems to me that we should be encouraged, rather than prevented, from making the fullest use possible of all information, whether derived from the papers and discussions of a technical society or derived from some other source, with the provisos: (a) that we give full credit to authors, and (b) that we do not mis-apply the data, so as to deceive, or as is more frequently the case, to partly deceive our clients or the public.

Another feature in the restriction is that it can hardly be enforced so far as the general public is concerned. The transactions of technical societies are placed in libraries and are accessible to the whole world; those who quote from these volumes give greater publicity and, provided they quote correctly and give due credit, they add rather than detract from the reputation of the society.

The last paragraph of section 2, bulletin 87, page 190, seems to me to bring forward a more important matter than the restriction above discussed. That is, the partial quotation of a report of an engineer in a prospectus. Such a partial quotation is almost invariably favorable to the property concerned, the qualifying paragraphs being omitted. This really occurs frequently in practice and is greatly to be condemned. When this is done, I think an engineer owes it to himself and to the public frankly to state in print the full truth about the deposit in question. If a summary is required, it should be written and signed by the engineer before being made public.

4. *Weights and Measures.*—Most engineers who have visited foreign countries will, I think, agree that a universal system of weights and measures is desirable for the whole world. The best system in use, and that which is already most in use, is the metric system. It is very desirable to make use of this system when practicable, but it must be remembered that language, as well as systems of weights and measures, is supposed to exist to convey information; also that financial men are very busy and want reports to be as brief and intelligible as possible. It is therefore necessary to use the systems of weights and measures in all cases that is most intelligible to the commercial interests involved, while also a good plan to give the equivalents in the metric system.

PERSONALS.

S. F. Shaw has returned to El Paso and is waiting there pending satisfactory reports from Mexico. He expects to go to Charcas as soon as political and transportation conditions will permit.

N. H. Darton, of the U. S. Geological Survey, has returned to Washington after a season of field work on the potash deposits of the Red Beds of New Mexico.

Henry M. Payne reached London in November after doing some professional work in Siberia; he had expected to come on to New York by the first of the year but was called back to Petrograd, and it is now uncertain when he will reach the United States.

Rush T. White, of the Caucasus Copper Co., has recently been in New York.

Louis A. Wright sailed on Feb. 7, for Santiago, Chile, in which city he will make his headquarters for the next two years.

W. J. Loring is now making his headquarters in San Francisco and has opened an office in the Crocker building.

G. M. Colvocoresses, General Manager of the Consolidated Arizona Smelting Co., of Humboldt, Ariz., attended the annual meeting of the Society, Jan. 11.

Richard A. Parker, after his recent trip to Boston and Washington, has been in the Southwest on professional business.

Hennen Jennings has been appointed one of the consulting engineers of the Bureau of Mines.

J. P. Hutchins has returned to Petrograd after visiting the Altai region in Siberia and examining the manganese deposits of Chiaturi in the Caucasus.

B. Magnus is on a trip which will take in Montana, Utah, Arizona and Tennessee to study modern practice at American copper mines and smelting works.

Benjamin B. Lawrence, a member of the class of '78, has purchased the Pelton-Doble water wheel and the Pelton-Francis turbine which were exhibited by the Pelton Water Wheel Co. at the Panama-Pacific Exposition, and has presented them to the Columbia School of Mines.

D. M. Riordan has taken an office in San Francisco. The New York Section of the Society will deeply miss his presence, but this will be to the gain of the San Francisco section.

H. W. Hardinge has been honored by the Franklin Insti-

tute and the City of Philadelphia, being awarded the John Scott medal and maximum cash premium for the invention of his conical mill.

O. M. Bilharz, formerly superintendent of the St. Joe Lead Co., is now operating in the Missouri zinc district.

Philip R. Bradley has become general superintendent of the Alaska Juneau mine, retiring as superintendent of the Treadwell group, with which he will continue to be connected as consulting engineer.

E. A. Cappelen-Smith has been elected a director of the Chile Copper Co. and the Chile Exploration Co. He has gone to Chile.

Gelasio Caetani, now an officer in the Italian engineering corps, has been wounded in action and recommended for the military medal.

Alexander P. Rogers sailed from New York on Dec. 26 for South America where he will be engaged in professional work for several months. His address will be care of W. R. Grace & Co., Oruro, Bolivia.

R. M. Raymond has been appointed to the Professorship of mining at the Columbia School of Mines, and will begin his duties in February, upon his return from a short trip to Mexico.

A. F. Kuehn went to Burma at the end of December to make an examination of the Bawdwin mine for the Burma Corporation.

CHANGES OF ADDRESS.

Charles W. McMeekin.....1270 Pine St., San Francisco, Cal.
F. J. H. Merrill.....218 Union League Bldg., Los Angeles, Cal.
Frank L. Sizer..701 First Nat'l Bank Bldg., San Francisco, Cal.
Louis A. Wright.....Casilla 112D, Santiago, Chile
D. M. Riordan.....525 Market St., San Francisco, Cal.
S. F. Shaw .....3800 Broadway, San Antonio, Tex.

STANDING COMMITTEES

Executive Committee

J. R. FINLAY
L. D. HUNTOON
A. S. DWIGHT
GEO. C. STONE
W. LINDGREN

Annual Medal

H. S. MUNROE, *Chairman*
JAMES F. KEMP
ARTHUR L. WALKER

Professional Training

A. L. WALKER, *Chairman*
F. W. BRADLEY
SIDNEY J. JENNINGS

Mine Taxation

J. R. FINLAY, *Chairman*
E. T. CONNER
H. C. HOOVER

Standardization

C. R. CORNING, *Chairman*
J. PARKE CHANNING
GEO. C. STONE

Panama-Pacific Engineering Congress

E. H. BENJAMIN
F. W. BRADLEY
C. W. MERRILL

Welfare of Mine and Metallurgical Employees

J. PARKE CHANNING, *Chairman*
R. M. CATLIN
W. Y. WESTERVELT

Mining Law

H. V. WINCHELL, *Chairman*

J. W. FINCH
F. W. SMITH
C. W. GOODALE
M. L. REQUA
S. W. MUDD
ALBERT BURCH

PAST PRESIDENTS

HENRY S. MUNROE.....1908-1909
HENRY M. CHANCE.....1913
J. PARKE CHANNING....1910-1912
JAMES F. KEMP.....1914
W. R. INGALLS.....1915

FORMER SECRETARIES

J. R. FINLAY 1908-1909
W. R. INGALLS.....1911-1914
HENRY S. MUNROE 1910
F. F. SHARPLESS.....1915

ANNUAL MEDAL

1914 { HERBERT C. HOOVER, LOU HENRY HOOVER
1915 ROBERT H. RICHARDS
1916 JAMES F. KEMP

Mining and Metallurgical Society *of* America

Bulletin Number Ninety-three
February 29, 1916
Vol. IX, No. 2

Published at the Office of the Secretary
115 Broadway, New York

OFFICERS FOR 1916.

President, J. R. FINLAY, 52 William St., New York.

Vice-President, WALDEMAR LINDGREN, Mass. Institute of Technology, Boston, Mass.

Secretary, Treasurer, } LOUIS D. HUNTOON, 115 Broadway, New York.

Executive Committee: } Messrs. J. R. Finlay, L. D. Huntoon, A. S. Dwight, W. Lindgren, G. C. Stone.

COUNCIL.

At large, ex-officio.

J. R. Finlay, New York.....Retires January, 1917
Waldemar Lindgren, Boston.....Retires January, 1917
L. D. Huntoon, New York.....Retires January, 1917

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C. W. Goodale.....Retires January, 1919

OFFICERS OF SECTIONS.

SAN FRANCISCO.	NEW YORK.	PHILADELPHIA.
M. L. Requa, *Chairman.*	J. E. Johnson, Jr., *Chairman.*	F. L. Garrison, *Chairman.*
W. H. Shockley, *Secretary.*	A. H. Rogers, *Vice-Chairman.*	
	D. M. Liddell, *Secretary.*	

Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. February 29, 1916 No. 2

ANNOUNCEMENTS.

Annual Medal.—Owing to the slow recovery in Professor Kemp's health, it has been decided to postpone the meeting for presenting to him the annual medal of the society until next October, by which time it is confidently expected that he will have returned to New York with renewed strength.

New York Section.—The next meeting of the New York section will be held at the Machinery Club, 50 Church St., on Thursday evening, March 16, preceded by dinner at 6:30.

The April meeting will be held at the same place and hour on Thursday, April 20.

It is suggested that a somewhat more punctual observance of the dinner hour, 6:30 p. m., will be appreciated.

The New York section held its monthly meeting on Thursday, Feb. 24, at the Machinery Club. Topics of vital interest regarding the Society's activities were discussed, which will be published in the bulletin for March. The Committee on Standardization made a report in which a great deal of interest was shown. A full report will appear in the March bulletin.

COMMUNICATIONS.

MINING LAW REVISION.

George W. Riter.—Somewhat aside from the usual argument for revision of the mineral-land laws, it would seem that the government, as the largest "ultimate consumer" of gold and silver, should be anxious to remove burdens and restraints from the precious metal branch of the mining industry. Centering in the public-land states, this branch of the mining industry has suffered most seriously from the laws; and if we are to believe census statistics, it does not succeed in paying its own way. In other words, the average cost of producing gold, which is the basis of our monetary system, has been made greater than the price paid by the mint. We hear a great deal nowadays on the decadence of prospecting in the west; and according to annual

statistics, the production of gold is on the decline rather than on the increase.

The 1910 census of Mines and Quarries[1] shows that deep producing mines in the precious-metal class, 2,845 in number, sold their annual product for $15,121,236 above the cost of production; but that non-producing mines, listed to the number of 8,352, spent $20,321,074 without getting any returns; indicating a deficit for the year of $5,199,838. The profits of placer mines reduce this deficit somewhat, but do not wipe it out.

A similar state of affairs was disclosed by the Special Census of Mines and Quarries, 1902.[2] If these reports fall short of the truth, they do so in minimizing the deficit, through not disclosing the whole amount spent on non-producing properties. In the 1902 report, it is stated specifically that the expenditures for preliminary prospecting and for annual assessment work are not included in the totals.

We know, of course, that some of the sums spent on non-producing properties were spent wastefully and foolishly; but we also know that many of these wasteful and foolish expenditures can be attributed directly to the peculiar requirements of our mineral-land laws.

If the government were looking forward to a time when it would no longer be the "ultimate consumer" of gold—having decided, perhaps, to stamp its money on paper exclusively—it might cease to have any direct interest in the production of precious metals. But so long as our monetary system is founded on gold, the government cannot consistently discourage this industry; and self interest should prompt the immediate repeal of laws that discourage and retard this branch of mining.

This is only a special phase of the discussion, but it might have influence with members of Congress who are interested in money and banking questions, but have only vague ideas on the mineral-land laws. In common with other mining men, I feel that the whole subject goes so deeply and has so many ramifications, that nothing short of general revision of the mineral-land laws, into a consistent, harmonious whole, will ever be satisfactory.

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[1]Department of Commerce: Thirteenth Census of the United States, 1910, Volume XI., "Mines and Quarries, 1909". Tables 7 and 9, pp. 334, 338.

[2]Department of Commerce and Labor: Special report of the Census Office. "Mines and Quarries, 1902". Table 1, Gold and Silver, p. 510.

SECOND PAN-AMERICAN SCIENTIFIC CONGRESS.

W. R. Ingalls.—As delegate of the Mining and Metallurgical Society of America to the Second Pan-American Scientific Congress, held in Washington, December 27, 1915, to January 8, 1916, I beg to report that the final actions of this Congress, of especial interest to the mining and metallurgical industry, comprised the following articles:

V. That proper steps and measures be taken to bring about in the American republics participating in the Congress a general use of the metric system of weights and measures.

XXVIII. (1) That a compilation according to a definite plan be made of the mining laws of the American countries.

(2) That the several American governments appoint a committee to consider the uniformity of mining statistics and to make recommendations to their respective governments for the systematizing, simplifying and standardizing of such statistics.

The technical papers presented in Section VII of this Congress, whereof Hennen Jennings was chairman, were of a high order of interest.

OBITUARY NOTICES.

GEORGE FANSHAWE MILLIKEN.

George Fanshawe Milliken died at his home at Flushing, N. Y., Jan. 29, aged 57 years. He was born in New York and graduated from the Columbia School of Mines in 1879. After several years' experience at Colorado and Arizona mines he was made general manager of the Costa Rica Mining Co. In 1890 he was appointed consulting engineer for the Northern Pacific Railroad Co., and in 1896 was examining engineer for the Mines Financial Trust Syndicate of London. From 1899 he practiced as consulting and examining engineer, serving also at different times as manager of the Waverley Gold Mining Co. of Nova Scotia; consulting engineer for the Miller-Spier Syndicate; chief engineer of the Nevada-Utah Mines and Smelting Co. He examined many well known mining properties and had a wide experience. He was a member of the American Institute of Mining Engineers and of the Mining and Metallurgical Society of America.

C. WILLARD HAYES.

Dr. C. Willard Hayes died in Washington, Feb. 8, aged 57 years. For 10 years he was Chief Geologist of the U. S. Geological Survey, leaving that position four years ago to become vice-president and general manager of the Mexican Aguila Oil Co. In that position he had charge of all the Cowdray-Murray oil explorations in Mexico as chief geologist. He had a high reputation as a scientific man, being numbered among the leading economic geologists of the world. Doctor Hayes was born in Granville, Ohio, and was educated at Oberlin College and Johns Hopkins University. In 1883 he became Principal of the Brecksville, Ohio, High School, and in 1887 received his appointment to the Geological Survey as assistant geologist, becoming Chief Geologist in 1902. During 1898-9 he was geologist to the Nicaraguan Canal Commission. Doctor Hayes was a member of the Geological Society of America, the American Institute of Mining Engineers, the Mining and Metallurgical Society of America, and a number of other scientific societies. He was the author of numerous articles on theoretic and economic geology in various publications and of many official reports.

CHARLES ALSTON PRINGLE.

Charles Alston Pringle, who lost his life with 17 other Americans at Santa Ysabel, Chihuahua, on Jan. 10, 1916, was born in Oakland, Calif., 36 years ago. He was educated at the University of California, where he was a prominent figure during his undergraduate days. He was active in athletics and a great football player, having captained his team in 1900. After leaving the University of California, he was engaged in mining work for several years in Mariposa and Nevada Counties, Cal., and at Victor, Colo. He was manager for several of the Schley mining properties, having been in charge of the Calera Mining Co., at Calera, Chihuahua, for about four years and manager of the Tintic Mining and Development Co. in Utah for one year. He had returned to Mexico several years ago, but had been compelled to leave when the revolutionary disturbances again became active in the northern section of the country. It is assumed that Mr. Pringle, like several others of the unfortunate party, was not proceeding to the property of the Cusi Mining Co. Mr. Pringle's family was from Charleston, S. C., and moved to California about 40 years ago. His mother, Mrs. E.

J. Pringle, four brothers and one sister, survive him in San Francisco, and another married sister is living in New York. He was a nephew of the late Donald Mitchel (Ik Marvel) and a member of Chi Phi fraternity and of the American Institute of Mining Engineers, as well as of the Mining and Metallurgical Society of America.

MEMBERS ELECTED IN FEBRUARY.

Lindberg, C. O.....Los Angeles, Cal.
Consulting Engineer.

Pyne, Francis R.,.....Elizabeth, N. J.
Asst. Supt. U. S. Metal Ref. Co., Chrome, N. J.

PERSONALS.

Sydney H. Ball has returned from examining mining property in Newfoundland.

Howland Bancroft has just returned to Denver from several months absence in South America and leaves within a few days to make his headquarters in Chile during the next two years.

J. V. N. Dorr has gone to Denver.

B. Magnus has just returned from a trip to the West and Southwest and will be at his office, 61 Broadway, New York.

J. B. Tyrrell, of Toronto, Canada, will sail for England on the "Baltic" on Feb. 9. His office address will be 208 Salisbury House, London, E. C., while in England.

William Y. Westervelt has returned to New York from Cuba.

H. A. J. Wilkens and W. B. Devereux, Jr., have formed a co-partnership to carry on the general business of consulting mining engineers and mine managers under the firm name of Wilkens & Devereux. Their New York address is 120 Broadway, and they will have representatives in Mexico City and London.

William Seward Mann is mill superintendent for the Calumet & Sonora Company, at Cananea, Mexico. Address, Hotel Alexandria.

Mr. John W. Finch, of Denver, who has recently been confined to a New York hospital with typhoid fever, is reported to be on the road to recovery and will go to Atlantic City in a few days to recuperate.

STANDING COMMITTEES

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J. R. Finlay
L. D. Huntoon
A. S. Dwight
Geo. C. Stone
W. Lindgren

Annual Medal

H. S. Munroe, *Chairman*
James F. Kemp
Arthur L. Walker

Professional Training

A. L. Walker, *Chairman*
F. W. Bradley
Sidney J. Jennings

Mine Taxation

J. R. Finlay, *Chairman*
E. T. Conner
H. C. Hoover

Standardization

C. R. Corning, *Chairman*
J. Parke Channing
Geo. C. Stone

Welfare of Mine and Metallurgical Employees

J. Parke Channing, *Chairman*
R. M. Catlin
W. Y. Westervelt

Mining Law

H. V. Winchell, *Chairman*
J. W. Finch
F. W. Smith
C. W. Goodale
M. L. Requa
S. W. Mudd
Albert Burch

Delegates to Cooperative Committee on Mining Laws

H. V. Winchell
J. Parke Channing
R. A. Parker
S. W. Mudd
M. L. Requa

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Henry M. Chance.....1913
James F. Kemp.....1914
W. R. Ingalls.....1915

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W. R. Ingalls.....1911-1914
F. F. Sharpless.....1915

ANNUAL MEDAL

1914 { Herbert C. Hoover / Lou Henry Hoover }
1915 Robert H. Richards
1916 James F. Kemp

Mining and Metallurgical Society *of* America

Bulletin Number Ninety-four
March 31, 1916
Vol. IX, No. 3

Published at the Office of the Secretary
115 Broadway, New York

OFFICERS FOR 1916.

President, J. R. FINLAY, 52 William St., New York.

Vice-President, WALDEMAR LINDGREN, Mass. Institute of Technology, Boston, Mass.

Secretary, Treasurer, LOUIS D. HUNTOON, 115 Broadway, New York.

Executive Committee: Messrs. J. R. Finlay, L. D. Huntoon, A. S. Dwight, W. Lindgren, G. C. Stone.

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W. H. Shockley, *Secretary.*	A. H. Rogers, *Vice-Chairman.*	
	D. M. Liddell, *Secretary.*	

Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. March 31, 1916 No. 3

ANNOUNCEMENTS.

Revision of Mining Law.—The Secretary has been informed by Mr. J. F. Callbreath that the House Committee on Mines and Mining, by a majority of one vote, refused to approve the Smoot Bill.

A letter, dated March 11, was received by the Secretary from the Hon. Carl Hayden, together with a copy of Bill H. R. 12,275, introduced by Mr. Foster. This Bill is to revise, amend and codify the sections of the revised statutes of the United States relating to the location of mining claims on the public domain, and for other purposes.

The Secretary received a second Bill from the Hon. Carl Hayden, H. R. 12,426, introduced by Mr. Hayden. This Bill is to authorize mining for metalliferous minerals on Indian reservations in the State of Arizona.

The Secretary wrote Mr. Hayden that these Bills will be given due consideration by the Mining and Metallurgical Society in its discussion of the revision of the mining law.

Joseph A. Holmes Safety Association.—A meeting was held on March 4, at which an executive committee was appointed consisting of: Van H. Manning (Acting Director of the Bureau of Mines), President; Dr. Charles Walcott (Secretary of the Smithsonian Institute), 1st Vice-President; Mr. Samuel Gompers (President of the American Federation of Labor), 2d Vice-President; and members at large, Mr. Hennon Jennings and Dr. John A. Brashear. Dr. George Otis Smith represented the Mining and Metallurgical Society at this meeting.

Council.—A meeting of the Council was held on March 16, at which time a resolution was passed to take up for discussion the revision of the mining law, and draft a bill to be presented to Congress. The minutes of this meeting will appear in detail in the next bulletin.

New York Section.—The April meeting of the New York section will be held at the Engineers' Club, 32 W. 40th Street, on April 19, at 8 p. m., preceded by an informal dinner at 6:30 p. m The object of this meeting is to discuss the society's campaign for revision of the mining law, and a full attendance is urged.

The March meeting of the New York Section was held at the Machinery Club, 50 Church Street, on March 16, J. E. Johnson, Jr., presiding. The members and guests present were: W. H. Aldridge, S. H. Ball, C. W. Boise, R. W. Deacon, J. F. Callbreath, H W. Du Bois, E. F. Eurich, J. R. Finlay, L. D. Huntoon, W. R. Ingalls, J. E. Johnson, Jr., J. V. Lewis, H. S. Munroe, Robert Peele, H. M. Payne, F. R. Pyne, A. H. Rogers, E. M. Rogers, G. C. Stone, J. H. Susmann, W. Y. Westervelt, G. D. van Arsdale, Ralph Williams and guest, and H. W. Gepp. A full account of the meeting will be published in the next bulletin.

COMMUNICATIONS.

PANAMA-PACIFIC EXPOSITION.

The Secretary, Mining and Metallurgical Society of America,
New York City:

Dear Sir: It was not possible for me to attend many of the convention sessions, neither was it possible for me personally to greet many of the delegates who attended the great number of congresses, conferences and conventions which met with us during the Exposition period.

I take this opportunity of expressing the appreciation of the Exposition management to the officers and members of your organization for the part they had in making the Exposition such an unqualified success. We consider the congress program one of the chief factors in producing that very gratifying result.

So many human interests were represented and the convention discussions had to do with such vital, practical, present-day needs, that we are certain that true international fraternity and world service were distinctly advanced.

We know that convention attendance was largely responsible for the symmetrical success of our undertaking. We rejoice, however, that the Exposition was the means of making all of us better neighbors. You know us better. We are glad you came.

Very truly yours,
CHAS. C. MOORE,
President.

March 11, 1916.

COUNCIL.

A meeting of the Council was held at the office of the Secretary, 115 Broadway, New York, on Friday, Jan. 21, 1916, at 4 p. m. Those present were: J. Park Channing, J. R. Finlay, W. R. Ingalls, F. F. Sharpless, George C. Stone, Hennen Jennings, Waldemar Lindgren, A. S. Dwight, P. N. Moore and Louis D. Huntoon.

Executive Committee.—The executive committee consists of the President, the Vice-President, the Secretary, and two members of the Council appointed by the President. Mr. George C. Stone and Mr. A. S. Dwight were appointed by the President and endorsed by the Council.

New York Office.—The Council again discussed the advisability and feasibility of renting office space in New York which would be at the service of the membership at large, where members could arrange for office space, desk room, etc., and where mail could be received by the members, or forwarded to them if desired. To carry this idea into practical operation would of necessity entail expense upon the Society. It was moved and seconded that the matter be referred, for the present, to the President and Secretary with power to act, and that a letter be mailed to all members of the Society, asking for an expression of opinion.

The Secretary was further authorized to make arrangements for a stenographer to look after all of the details; the salary of such stenographer, or assistant secretary, not to exceed $50.00 per month.

Report on Mining Law.—Mr. Finlay reported the interview which Mr. Callbreath held with several members of the Council, in New York, on January 19. It was moved and carried that, in case the bill now before the House Committee should not be passed, the President of the Society request the chairman of the Committee on Mining Law to draft a measure for new mining law legislation, and submit it to the Council as soon as possible.

Council Meetings.—Mr. P. N. Moore, suggested that, if convenient, the Council meetings be held on the fourth Friday of the month, at which time the directors of the A. I. M. E. hold their meetings. If this suggestion is carried into effect, it will permit out-of-town members of the Council, who are also directors of the A. I. M. E., to attend both meetings.

LOUIS D. HUNTOON,
Secretary.

MEETINGS OF SECTIONS.

NEW YORK.

The February meeting of the New York Section was held at the Machinery Club, 50 Church St., on February 17, J. E. Johnson, Jr., presiding. The members and guests present were: Luis Amenabar, S. H. Ball, Percy E. Barbour, R. W. Deacon, J. R. Finlay, William Griffith, L. C. Graton, L. D. Huntoon, W. R. Ingalls, J. E. Johnson, Jr., D. M. Liddell, H. S. Munroe, Robert Peele, Gilbert Rigg, A. H. Rogers and G. C. Stone.

After calling the meeting to order, the chairman said that before beginning the discussion of the report of the Committee on Standardization, Mr. Finlay wished to address the meeting.

Mr. Finlay.—Since becoming officers, Mr. Huntoon and I have had several discussions as to the future of the Society and the work that we could take up. However, we have held up all projects for new work until we could discuss with the Society where we stand. Certain members feel that the Society has outlived its usefulness and that the best interests of all concerned would be served by the Society's committing polite *hari-kari*. There is no doubt that there is much of this sort of talk, and I hardly know how seriously to take it. The American Institute of Mining Engineers is now doing many of the things we have been doing, and it is doing some of them better. For instance, at the dinner tonight we have 17 present, while at the last meeting of the local section of the A. I. M. E. there were 100. The section of the Mining and Metallurgical Society in San Francisco has practically ceased to exist, and the section in Philadelphia has discontinued its active career. Consequently, the Society is reduced to the one active New York section.

As officers, we cannot do anything except the best we know how. It is not interesting to keep this Society going as a mater of formality, and we wish the members would express themselves freely as to the advisability of continuing it at all. Of course, there are certain activities that we are committed to, and must carry on; for instance, the presentation of the annual medal, and our struggle for the revision of the mining laws. But are we, in the main, merely going through the motions of keeping up an active society? There is no question that this Society has done a considerable work for the mining engineer, if in no other way than in encouraging the American Institute to perform the functions which it has now taken up. I have made these remarks in order to invite those who are not officers to say what they think on this matter.

The Chairman.—I am very glad that Mr. Finlay, President of the Society, has brought this matter up. There is no doubt that conditions are vastly changed from what they were at he time this Society was founded, and I know that some of its prominent members are now asking seriously whether there is enough of a future to justify its continued existence, if that is the case, it may be better to kill the Society than to have it die on our hands. The A. I. M. E. is now doing those things its neglect of which caused the formation of this Society. History is full of similar cases, where the parent body has swallowed a smaller seceding group after it had been forced by the reformers to do what it should have done originally. One example, for instance, is the homeopath, who undoubtedly exercised the greatest possible influence in reforming the practice of medicine; although today he exercises very little real influence in medicine, the old-school practice has conformed to his bitterly fought contentions.

This Society was originally badly needed, but I do not know that it is now. Certainly it now means that there are two section meetings in the month, the A. I. M. E. dinner and the Mining and Metallurgical Society dinner, which largely duplicate each other. I think we should definitely ask ourselves whether there is a sufficient reason for this duplication; we must decide definitely whether there is or not; whichever is the correct answer we must know it.

Professor Peele.—I must say that I feel a good deal of personal interest in the perpetuation of this Society. Membership in it is in many ways more satisfactory than membership in a larger body. Although the small gathering tonight may seem to indicate less interest than it is pleasant to contemplate, we must remember the magnificent meeting that we had last month. I regret to say that this is the first meeting in this building that I have attended, but my absences have been due chiefly to circumstances beyond my control.

Mr. Huntoon.—I do not think that Mr. Finlay's idea is to disband the Society, but merely to find out what we are to do; whether or not to continue the monthly meetings of the New York section.

Mr. Stone.—There is as much necessity for the existence of this Society now as when it was founded. The Institute of Mining Engineers has increased its activities, but it is now doing all that its constitution allows. The Institute, as a body, cannot express an opinion. We can express opinions on ethical sub-

jects and on general matters. At the start, our section meetings were devoted to the discussion of general matters, and technical papers were not read. I do not know but what it would be well to go back to that practice of discussing subjects of purely general interest. The Institute voted to amend its constitution so as to allow it to express opinions on various matters, but the Board of Directors of the Institute has not done so, and we are advised by counsel that it cannot constitutionally do this.

Mr. Rogers.—I think that Mr. Stone has struck the keynote. This is purely a professional society. The Institute is a heterogeneous gathering, and even if it could express an opinion, what good is it? I certainly do not want this Society to come to an end.

Mr. Finlay.—I am glad to hear these opinions. Personally, I have taken much more interest in this Society than in the American Institute of Mining Engineers—chiefly because this Society did not hold technical sessions. But I have been greatly influenced by the New York members who confessed to me their fears that the Society had outlived its usefulness; also by a man whom I recently met in Butte, who, when I referred him to our own bulletin for information on a technical subject he was investigating, said that he had not looked at the bulletin for months. I was disposed to fear that the interest in the Society was a formality and not an actuality.

Mr. Griffith.—I come from a town in Pennsylvania in which there is only one other member of the Society; it is not possible, therefore, for local interest to exist, but it must grow as a result of attendance at your meetings here. I have been always impressed with the idea that while the Society is small, and has had but few years of life, it has nevertheless attained a national reputation. The Mining and Metallurgical Society, and its members, are always referred to with a great deal of respect in other technical societies, in technical publications, and even in the daily papers. Certainly any society of which this can be said is well worth while.

H. S. Munroe.—Several speakers this evening have touched upon certain distinctions between the objects of this Society and those of the American Institute of Mining Engineers. It is important to recognize clearly and to emphasize these differences in the purposes of the two organizations that we may see clearly our special field of work and usefulness.

The Institute is primarily a society for the collection and publication of professional papers. This is clearly stated in Sections I and IV of its certificate of incorporation. Its members receive a *quid pro quo*. For ten dollars each member receives numerous bulletins and several volumes of transactions, as well as other privileges and benefits.

The Mining and Metallurgical Society was organized on a more altruistic basis. Our ruling purpose is that of service, to the public; to the mining industry, to mine investors, to mine employees, and to the profession. We have already done good service in several important lines, for the better protection of mine investors, for the increased safety of mine workmen, for the revision of the mining law, for the advancement of professional ideals. When a committee was appointed by the American Mining Congress to frame a code of laws and regulations to promote the safety of miners, it came to this Society and to other technical organizations for advice. I think we are justified in saying that the committee got more from this Society than from all the others put together. In the movement for the revision of the mining laws the Society has taken the leading part.

The ruling purpose of the Society is well illustrated in the award of our gold medal which is given each year for "distinguished service," in one field of work or another.

If the members will take the trouble to read the constitution of the Society they will find a number of altruistic aims outlined, some of which we have developed, and some of which remain for the future activities of the Society. I do not think that we shall have difficulty in finding work to do. We are committed to the attempt to secure the revision of the mining laws. This work is only just beginning. We have a committee on standardization which promises to keep us supplied with important topics for debate. We have a committee on mining education which may inaugurate useful discussion, and perhaps suggest good work that may be of assistance to our mining schools. The Institution of Mining and Metallurgy of Great Britain has organized a plan of post-graduate courses, in connection with the Royal School of Mines, consisting of two years' practical mining work under the auspices and direction of the Society. This is an important and useful line of work, and will go far toward filling the gap between engineering theory and practice. Again, much research work and valuable investigation are being done by the Carp Mining and Smelting Corporation in this country; by the Anaconda Co., by the Federal Lead Co., by the Utah Copper Co., by the Copper Queen, Inspiration and Miami companies, by the American Smelting and Refining Co. Doubtless there is much

duplication of work, and it would be of great advantage to these companies, and to the profession, if this work could be coordinated and the data made available. Possibly the Society could undertake this.

Mr. Rigg.—I am probably somewhat influenced by a certain traditional feeling in favor of dual representation. Those of us who are engaged in research work on a large scale have learned that there comes a time when it is desirable to let go of an investigation and turn the whole thing over to the operating department, and I think it is probably a healthy sign when the Institute takes over and proceeds to carry on some of our work. Such matters may be regarded as through the research stage and ready for the operating. It is for us to tackle something else. For instance, there is the patent law. It has been suggested lately that the referee or judge in patent cases should be reinforced by technical men as advisers. Again, Professor Van Hise recently brought out some very interesting studies concerning the Sherman law and its effect on the conservation of resources. These are points which are best discussed by a small body of men before they are put up to larger societies. I think that the further this Society gets away from technical sessions and into the discussion of matters of general importance, the better it will be. Certainly there is an ample field for our endeavors.

Mr. Barbour.—I have nothing to add to what has been said as to why we should go on, but I can see one very good reason why we can't quit. We have had the steamroller run over us by a lot of cheap politicians in Washington, and now we have got to stay in the fight until we win, as far as the revision of the mining law is concerned.

Mr. Deacon.—The points that Mr. Stone has brought out are the ones I had especially in mind, particularly the one concerning the difference in activities possible in the two societies, owing to the constitutional restrictions of the A. I. M. E. as compared with our Society. As long as the limitations of the A. I. M. E. constitution remain as they are, this fact alone would, in my opinion, justify the continuation of the Mining and Metallurgical Society of America.

Mr. Graton.—Though a comparatively recent member, I have followed with a great deal of interest the progress of this Society from the time of its inception. I was early impressed with the numerous ideas and policies, somewhat radical perhaps, as compared with former standards, but unquestionably valuable, timely and effective, which this Society originated. Equally

impressive has been the appropriation of these, one after another, by the older, larger organization, the American Institute of Mining Engineers. It may be urged that with these plans and policies adopted and in operation by the larger organization, there is little reason to continue their advocacy and practise by the originating body. It is also perhaps true that some of the most important and fundamental of these innovations were brought forth early in the Society's history and that the more recent years have been less productive in this respect.

It is not altogether surprising, therefore, that such questions should arise as these: Has not the Mining and Metallurgical Society largely outlived its usefulness? Whether one considers that the Society has accomplished the principal objects for which it was organized and, therefore, has succeeded, or, on the other hand, feels that it has been unable to make a permanent place for itself and maintain a constructive policy, and therefore, has failed, is it not true, in any event, that the future holds little of attraction or opportunity for the Society?

Whatever may be the wise answer to such questions, and regardless of the extent to which the assumptions on which they obviously rest may be justified, President Finlay is right in asserting that it is eminently desirable to face the situation fairly and squarely; the Society has reached a stage when it may with advantage make a careful appraisal of the future.

It is true that the Institute has stolen much of the Society's thunder. That means nothing more, however, than that the improvements and advances are now enjoyed by a very large number rather than a few of those engaged in the mining profession. And the Institue itself, toward which, as the representative organization of the mining industry, all of us I suppose will ever feel a sense of obligation and devoton, has profited immeasureably as a result of the Society's activities. Evidences of this are found on every hand, but the feature of most vital consequence has been the thorough rejuvenation of spirit in the Institute, which has resulted in part as a direct result of following the trail blazed by the Society, and in part through its own efforts, stimulated as they have been by the competition afforded by the Society's existence. Surely this is an accomplishment well worthy of any organization.

But reform and progress are no more certain to be stable and permanent in the policies of a large society than in the politics of a city or state. If the Mining and Metallurgical Society were to feel its chief objects accomplished and therefore were to disband, the stimulus, the inspiration, the motive power actuated by competition would largely be withdrawn from the

Institute and there would be no check or governor to prevent a gradual slackening of effort, the spread of a feeling of smug complacency, and at last a decline to dull conservatism and inefficiency.

On the other hand, a society such as ours, consisting of a small group of men of certified experience and ability, of high ideals and unselfish motives, may constitute and, as shown by past experience, is needed as a main-spring, a torch of inspiration to the fires of accomplishment, a very wholesome control with respect to the welfare and efficiency of the Institute. The benefits outside the mining profession that have resulted from such propaganda as professional ethics, protection of investors, etc., are too evident to require more than mention. In short, as Professor Munroe has emphasized, many of the fruits of its efforts may not be harvested directly by this Society itself, but satisfaction and reward will come through the wider service it has rendered.

As to the idea that the Society has not maintained latterly the high productivity of radical and suggestive ideas that characterized its first years: the Society, as I understand it, came into being because an accumulation of conditions challenged attention and demanded consideration and treatment. It was natural and inevitable that the energies of the Society should first be directed toward these matters, and equally inevitable, probably, when these should have been handled and in large measure disposed of, that there should come a breathing-spell. This by no means signifies, however, that the work in sight is completed. Surely, such objects as have been suggested even in the course of the extemporaneous discussion this evening, indicate that there is no dearth of opportunity for worthy effort and needed accomplishment, which this Society is better fitted than any other to exert and undertake.

Mr. Ball.—So long as the membership of the American Institute is heterogeneous, I can see many good reasons for the existence of a strictly professsional society!

Mr. Finlay.—Mr. Johnson and I seem to be the only ones with any doubt on the subject of the advisability of this Society's continued existence. However, here are two pracical questions which I would put up to the meeting: (1) Is it worth while to start a personal campaign for new members? (2) Should we make an effort to issue a bulletin of any special size?

Mr. Ball.—I would suggest that both the date of the next meeting and the second meeting ahead be published in the bulletin, thus giving the members notice all over the country as to

when these meetings are to be held, and affording an ample opportunity, if they are going to be in New York, of aranging their visits so as to get here for these meetings.

Mr. Barbour.—As to the suggestion by Mr. Ball about publishing in the bulletin, the date of the meeting two months ahead. I know from my experience with the A. I. M. E. section meetings how difficult it is to arrange these matters so far in advance. As to the technical value of this Society, several years ago I was having a great deal of difficutly with the breakage of drill steel. The first article that I ever saw on this subject was published in the bulletin of the Mining and Metallurgical Society. I have kept a careful file of material on this subject—the literature is very meager—and the best article in my opinion that has yet appeared was in our own bulletin. As to the bulletin, I think we ought to publish just what we have. Personally, I am glad to see the volume thin. I think the bulletins of the Institute are getting too fat.

Mr. Finlay.—I am much struck by what has been said in this discussion here tonight, and think that possibly I have been too much impressed by the failure of local sections, and that others have been similarly misled.

The Chairman.—The subject announced for discussion this evening is the report of the Committee on Standardization, of which Mr. Stone is the only member present tonight.

Mr. Stone.—The report of the Committee on Standardization was, of course, made to the council, which invited discussion by the Society on this subject.

The Chairman.—Was there any specific reason for omitting methods of sampling from this report of the Committee on Standardization? When you give a sample to five or six good chemists, the results do not vary widely; but when you have five or six samplers working on the same material the results show wide discrepancy, even when all the samplers attempt to be honest.

Mr. Stone.—You must remember that ours was a preliminary report only, involving mainly the standardization of terms and definitions. Sampling and analysis are to be taken up. The committee is working on these matters; we have sent letters to many of the larger plants in the country, to men who are interested in these fields, and we hope for the cooperation of the American Chemical Society, which is also working on these questions.

Professor Peele.—Regarding exclusion of the subject of sampling, it was discussed by the original committee, since disbanded, in its first year. Messrs. Corning, Jennings and I composed that committee, and talked over this matter at some length. It seemed to be impossible to classify sampling operations which are carried over widely varying conditions, and to place and character of mineral deposits. We finally thought we had better omit it, and not attempt to standardize sampling practise in the mines.

Mr. Ingalls.—I should suppose that the committee could make some general recommendation; for instance, that quartering is to be condemned; or that in sampling ore every tenth shovelful should be taken.

Professor Peele.—These were some of the points that were discussed, but sampling methods, as a whole, could not be standardized.

Mr. Stone.—It is certainly true that there are so many things to be sampled under so many different conditions that standardization is difficult. But, at least, reports might state how the samples were taken.

Mr. Rigg.—That in itself would tend toward standardization. If engineers had to describe the methods under which they were operating they would be more careful as to what those methods were.

Professor Munroe.—It is probable that certain things may be standardized. For example, it is well known that for any given ore a proper relation must exist between the weight of the sample taken and the fineness of crushing. These size-weight ratios can be formulated for different classes of ores. Again, a set of rules might be adopted governing the methods of sampling and condemning methods known to be bad.

Mr. Stone.—That would at least eliminate getting specimens where samples were desired.

Mr. Finlay.—I can't tell you anything about principles, but I can tell you a good deal about practice. Samples as taken at some mines, are invariably too high. For instance, at Goldfield we had about 12,000 to 14,000 samples taken each month, by probably a hundred different persons who had no interest in falsifying the returns. These samples were invariably 20 to 35 per cent higher than the ore, and we adopted a factor by which sample results were always diminished.

Mr. Johnson.—Why is the error always on the high side?

Mr. Finlay.—I don't know; but look at the porphyry coppers. If you read their reports, they are always about to get ore of the grade shown by the original drill hole, but they never are getting it.

Mr. A. H. Rogers.—Referring to the case of porphyry coppers, I think Mr. Finlay's statement does not take into account the effect on tonnage of the lower grade mentioned. It is probable that most of the porphyries will yield larger tonnages than they have been credited with, but the grade will be lower. I think this is due to the fact that in the original calculations material considered of too low grade to pay was not included in the tonnage calculations. But when the ground is mined, a good deal of this low grade is broken with the ore and so reduces the average, although increasing the tonnage. Another factor influencing this is that lower costs than some of the original estimates permit of a profit on lower-grade material. As to drill-hole sampling, many holes were tested by putting up raises on them and sampling the channel of the drill by moil. The moil sampling, in all cases I have examined, checked the drill-hole sampling closely.

However, in general, I am of the opinion that you cannot standardize mine sampling. There are very few cases to which any one rule could apply. The method used must depend on the judgment of the engineer. After the ore is broken, it is possible that standardized mehods might be applied, based upon some relation between grade of the ore and the size to which it should be crushed for each cut.

Mr. Huntoon.—I believe that Warwick worked out the theory of sampling fairly completely and Richards devoted several pages to the subject. I asked Mr. Channing, when he was sampling at Miami, how the ore checked with the drill holes, and he said that the agreement was exact. As regards a grab sample, I think it is impossible for a good one ever to be taken. The man who takes a grab sample ought to be blindfolded.

Mr. Stone.—Don't you suppose that I could tell ore from waste, even in the dark?

Mr. Huntoon.—I encountered this problem several years ago, at Yale, when we were preparing large quantities of samples for the use of the students. They were using a Cripple Creek ore in which the portions of valuable mineral broke much more easily than the country rock. The result was that on the first breaking and screening the high-grade immediately went through

the screen, while the low-grade was the last material pulverized, giving a fair separation of valuable from valueless minerals immediately. When the final crushing was completed, one could roll and roll, and it was almost impossible to get the samples mixed again.

Mr. Finlay.—Whatever may be the practice in other parts of the country, I am inclined to think that Cripple Creek practice was thoroughly standardized, and that most of the people who made money out of custom mills had the standard practice down fine. For instance, using trough feeders with Vezin samplers, the fines will run on one side of the spout and the coarse on the other. I noticed that in sampling, at many mills there, the sampler, which takes a radial cut, was always bent to take least of this high-grade material. If the high-grade material was flowing at the outer edge of the feeder trough, the sampler would always be accidently bent inward. If the rich material were flowing at the inside edge, the sampler would always accidentally be bent in on that side and out on the other.

The Chairman.—I remember a difficulty when we were trying to determine carbon in pig iron. We were taking samples by drilling the pig, but we could not get concordant results. The trouble was that the graphite in the pig broke more easily than the iron itself, and that the fine material was of an entirely different character from the coarse in the drilling. We finally sifted the samples and took proportional parts of coarse and fine, from which a sample was made up. It was impossible to weigh out a gram or two grams from the drillings and get the proper proportion, but by this method of separating coarse and fine, concordant results could be obtained. Finally, however, we took all of the samples from a drill hole in order to make the determination.

Mr. Finlay.—Regarding Mr. Huntoon's difficulty in sampling rich ores, and the statement that has been made here that one always gets too high results, while that has been true with my experience on gold ores, it is not always so with other ores. It may work out the other way. For instance, in southeastern Missouri where the drill records show 25 feet of 1 per cent. ore, stoping will often show 50 feet of 5 per cent. ore. Average drilling down there shows that 12 feet-per cent. indicates an output of 1,000 tons lead to the acre. It perhaps would be well to give an explanation here of what a foot-per cent. is. If you have 1 foot of 1 per cent. ore, it is known at 1 foot-per cent.; 6 feet of 5 per cent. ore would be 30 feet-per cent. However, average yield is 2,500 tons to the acre, and the average drill record

will be about 30 feet-per cent., but actually, to get this yield, you need 75 to 80 feet-per cent. This shows what a great allowance must be made on account of persistent underestimating.

Professor Munroe.—What size core is being taken from the drill hole?

Mr. Finlay.—One and one-quarter inch.

Professor Munroe.—Would this not cause greater wastage of the valuable material than with a larger drill?

Mr. Finlay.—Probably less.

Mr. Griffith.—I think perhaps the unconscious personal error, where samples are taken by hand, is one of the difficulties. You send a man underground to sample the ore and he brings out specimens of ore; whereas if you told him to get samples of rock, his samples would probably come considerably nearer representing the actual contents of the mine. There is certainly a general bias in favor of the thing that we are told to sample. Perhaps much better results would result by having trained samplers who do nothing else.

The Chairman.—The ore miners of Lake Superior maintain one or more regular samplers who do nothing else. As a result, millions of dollars change hands on the samples taken by a few professional samplers and assayed by the chemists of recognized standing. When one of those professional samplers has taken his sample of a carload of ore there is usually no dispute as to its accuracy.

Mr. Ingalls.—This report of the committee now under discussion is simply a first report, to get us in line with the Institution of Mining and Metallurgy. The I. M. M. has already paid attention to this subject before we took it up. The idea is to cooperate with the I. M. M., and the incompleteness of our report is due to the fact that this is all that the I. M. M. has done. The only difference of any importance, so far as we have gone, is on screens. The Secretary of this Society has recently received a request from the I. M. M. to defer action until after the war. This seems to be advisable, inasmuch as there is a difference of opinion even among our own members on this subject. At any rate, the committee is now going ahead into a long list of things not yet taken up by the I. M. M. I suggest that every member write out and send to the committee any note on the question of standardization that occurs to him.

Professor Munroe.—It has been shown this evening that many members do not read the Bulletin. If any committee de-

sires to secure information or promote discussion of matters in their province it is an excellent plan to send personal circular letters, through the Secretary's office, perhaps to the whole membership, or to a selected list, in each case of those most interested. If these letters are short and to the point a large number of answers will be obtained. This method is in successful use by several societies.

Mr. Stone.—The committee has already done this, but rarely receives answers from 5 per cent. of the members.

Mr. Ingalls.—Certainly there are many things on which practice can be somewhat standardized, and the members of the Society be greatly helped. Things are constantly coming up about which we don't know very much. The individual member doesn't know what to do, but he has to do it. Now Mr. Rigg, for instance, knows a lot about pyrometry. He could give us such instruction on that subject that when anybody had to make any pyrometer observations he would at least know the worst errors to avoid.

The Secretary. — While the Society has been discussing standardization of terms and practice, it is interesting to note that the Society and its members have been standardized by Mr. Wickersham, Congressional Delegate from Alaska. I wish to read you a few extracts from the *Congressional Record,* which since the Harrison Anti-Narcotic bill went into effect, is the finest first aid to the sleepless that I know. Mr. Wickersham is speaking:

> All of these scientific mining societies have great big fine names—lobbying, of course, is very undignified and is not nice any more. It isn't done by the best people. The lobbyists won't come around any more—that is, as a lobbyist. So now they form a scientific mining society of high-sounding name, and these gentlemen appear here as officials, but not as lobbyists.
>
> The other day I called the attention of the committee to some of the letters these Society officials were writing to us. They are all nice men; they write nice letters; it is a great pleasure to receive them. I have enjoyed them so much that I have kept them pasted in this little book. They come from Mr. Sharpless, Secretary of the Mining and Metallurgical Society of America. Mr. Sharpless is at 52 Broadway, New York, and if we look a little closer into their business connections and addresses, you will discover there is quite a colony of them around 52 Broadway, New York, interested in this bill—and I do not want that Broadway bunch to mine the miners in Alaska, even if they do mine the miners in Colorado. Now Mr. Sharpless may have been west of the Missouri River, but I doubt it. He is the agent in New York, at 52 Broadway, for a mining company in London. He is engaged in selling stocks, I imagine, from the title, although I do not have any sure description of the character of their business.

Mr. Garland.—He is a promoter?

Mr. Wickersham.—Possibly—I do not know. Mr. W. R. Ingalls also appeared as a voluntary witness; he is president of the Mining and Metallurgical Society. Mr. Ingalls is a nice gentleman—you all saw him and realized that at once. His address is 505 Pearl Street. New York, and he is editor of the "Mineral Industry" and President of the Mining and Metallurgical Society of America. But what he knows about mining law, or why he ought to be on any commission for the revision of the United States Mineral Land Laws is something I cannot find out. . . Mr. J. Parke Channing, who appeared here, has his office at 42 Broadway. 42 Broadway—that is the Amalgamated Company's office, isn't it? Now we will just find out. It just struck me, that is the Amalgamated Company's number. Here it is in Poor's "Manual of Industrials," 1915. Yes, New York office, 42 Broadway. He is a little too close to the Amalgamated—just a little too close to put him on a commission to revise the Mineral Land Laws in Alaska. He is also a director in the General Depelopment Company and the Miami Copper Company. In other words, he is a copper man, has his number at the same number on Broadway with the Amalgamated, and being in the copper business and at the same number, he ought not to be on this commission. This committee ought not to fool away very much time listening to him. * * * * Then comes Sidney J. Jennings. Now Mr. Sidney J. Jennings is a director of the Tennessee Copper Company, as you will see on page 2567 of Poor's "Manual of Industrials." Mr. Jennings is a director in the Tennessee Copper Company. . . . Then W. L. Saunders appears. He is president of the American Institute of Mining Engineers and one of the speakers. He is also a director in the International Harvester Company. See Poor's "Manual of Industrials," 1915, page 388. Now, why a man who is a director in the International Harvester Trust should be taking such a deep interest in the revision of the United States Mineral Land Laws in the West you can guess as well as I can. The fiscal agent of that company is J. P. Morgan & Company, one of the partners in the Alaska Syndicate and Guggenheim Copper Trust.

Later, Mr. Wickersham having discussed H. V. Winchell, C. W. Goodale and M. L. Requa at too great length to quote, finished up with the remark: "There are the three men who prepared these reports and the arguments in favor of this bill."

Mr. Taylor.—Hasn't Mr. Kirby been at the head of this business for a long time?

Mr. Wickersham.—He thinks he is, but he is not.

After a little more desultory discussion the meeting adjourned at ten o'clock.

DONALD M. LIDDELL, *Section Secretary.*

PERSONALS.

E. G. Spilsbury has been elected President of the Engineers' Club of New York.

Dr. Henry M. Payne, mining engineer, has returned to New York after a long sojourn in Siberia and Russia, where he was engaged in professional work.

Pope Yeatman gave a dinner at Delmonico's on March 2 in honor of Fred Hellmann, General Manager of the Chile Copper Co., who is visiting New York.

Donald M. Liddell, for several years managing editor of the **Engineering and Mining Journal,** has resigned, and is now consulting engineer with Merrill, Lynch & Co., 7 Wall Street, New York. Percy E. Barbour succeeds Mr. Liddell as managing editor.

W. W. Mein sailed from New York February 28 for England, on his way to South Africa to investigate some of the Rand mines.

George S. Rice, chief engineer for the Bureau of Mines, has removed from Pittsburgh to Washington.

E. A. Cappelen Smith has been elected a director of the Chile Copper Co.

CHANGES OF ADDRESS.

Bancroft, Howland.....c/o American Consul, Valparaiso, Chile
Chase, Charles A.....Cooper Bldg., Denver, Colo.
Claghorn, C. R..Durham Colliery Co., Durham, King Co., Wash.
Conner, Eli T.Room 459 Mutual Life Bldg., 26 Liberty St., N. Y.
Cottrell, Dr. F. G.
c/o Bureau of Mines, 506 Custom House, San Francisco.
Farish, John B.....Los Pinetos, San Mateo, Calif.
Raymond, Prof. R. M.
School of Mines Bldg., Columbia University, New York.

STANDING COMMITTEES

Executive Committee

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Geo. C. Stone
W. Lindgren

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J. Parke Channing
R. A. Parker
S. W. Mudd
M. L. Requa

PAST PRESIDENTS

Henry S. Munroe.....1908-1909
Henry M. Chance.....1913
J. Parke Channing....1910-1912
James F. Kemp.....1914
W. R. Ingalls.....1915

FORMER SECRETARIES

J. R. Finlay 1908-1909
W. R. Ingalls.....1911-1914
Henry S. Munroe 1910
F. F. Sharpless.....1915

ANNUAL MEDAL

1914 { Herbert C. Hoover / Lou Henry Hoover
1915 Robert H. Richards
1916 James F. Kemp

Mining and Metallurgical Society *of* America

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W. R. Ingalls, New York.....Retires January, 1919

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District 8—Colorado and Utah.

Philip Argall, Denver.....Retires January, 1918

District 9-10—Alaska, Oregon, Northern California.

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Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. April 30, 1916 No. 4

ANNOUNCEMENTS.

New York Section.—The last meeting of the New York Section for the present season will be held at the Engineers' Club, 32 West 40th St., on Thursday evening, May 18, preceded by an informal dinner at 6:30 p. m. An illustrated lecture on "Mining of Frozen Gravels of Siberia and the Yukon" has been promised by H. M. Payne.

The next following meeting will be held on or about Sept. 14, of which due announcement will be made later.

COMMUNICATIONS.

REFORM OF MINING LAW.

At the Northwest Mining Convention, held in Spokane, Mar. 20-25, the following resolutions were passed.

Whereas, the mineral-land laws of the United States and Alaska, framed nearly 50 years ago, are unsuited to present needs and have developed various evil and radical defects that seriously retard or wholly prevent the development of our mineral resources; and

Whereas, in consequence of this recognized failure of present United States mining laws adequately to meet the requirements, there is everywhere among mining men a pronounced and growing dissatisfaction; and

Whereas, owing to the thoroughness with which our older mining districts have been surface-prospected, the discovery of new, valuable and, usually, more or less deep-seated mineral deposits is growing more difficult; and

Whereas, those states that have endeavored to correct certain of the defects in the said United States mining laws have found that patchwork legislation is impracticable and that nothing constructive and permanent can be done effectively without Congressional authority; and

Whereas, many unsuccessful attempts have been made in the past to interest Congress in this most important matter of mining-law revision; therefore, be it

Resolved by the 1916 Northwest Mining Convention, assembled at Spokane, Wash., that it is the conviction of this representative body of Northwest mining men that any further delay upon the part of Congress to take definite action in regard to an expert and comprehensive re-

vision of United States mining law must inevitably work great hardship upon the mining industry as a whole and may even threaten its future. Consequently the convention hereby petitions that this sixty-fourth session of Congress appoint forthwith a mining-law commission of not less than five prominent persons closely and actively identified with the mining industry and thoroughly competent to take evidence in the principal mining centers of the United States and Alaska over a period of not less than one year, and afterward to work out, for presentation to the next session of Congress, a harmonious and thoroughly coordinated code of mining law that shall best serve and safeguard the present and future interests of all concerned.

Resolved, that it is the sense of this convention that the said commission should consist of at least one business man, one mine operator, one mining engineer and two mining lawyers, each of acknowledged ability and sound judgment; also, that the members of this commission should receive such adequate compensation for their services as would justify them in devoting their entire time and energies to a solution of the numerous problems involved.

Resolved, that it is the conviction of this convention that this revision of United States mining law cannot be accomplished successfully in any other manner than in that specified above, namely, by means of a duly accredited commission, and therefore that the House Committee on Mines and Mining did a wrongful act in rejecting the bill providing for a commission to study and recommend such revision and that any bill originating within the said House Committee on Mines and Mining will necessarily prove wholly inadequate and even more detrimental to the mining industry than are the present mining laws.

Resolved, that it is the conviction of this convention that the House Committee on Mines and Mining erred at its hearing on Jan. 5, 1916, and thereafter in permitting itself to be swayed by the arguments of Hon. James Wickersham, delegate from Alaska, whose challenges of the personal motives of the distinguished petitioners appearing before the committee, as representatives of the mining men of the so-called metalliferous states, this convention believes to have been unfounded and unjust.

Resolved, that copies of these resolutions be sent forthwith to the Senators and Representatives from the Pacific Northwest States with a request for their active interest in the matters involved.

F. A. ROSS, Chairman.
E. N. BRANDEGEE, for Montana.
GLENVILLE A. COLLINS, for Montana.
FRED A. STARKEY, for British Columbia.

Dr. James Douglas.—In a letter of April 18th, received by the Secretary, Dr. Douglas calls attention to the fact that the Detroit Copper Co. and the Lazinskys have waived the apex provisions in advance of all their neighbors in the Southwest. This action has been effective ever since as between the Arizona Copper Co. and its neighbors.

"The most important agreement of that kind has been between the Copper Queen Consolidated Mining Co. and the Calumet & Arizona Mining Co. In spite of our close contiguity, and the many causes for friction which would inevitably have paralyzed the whole district under the working of the apex law, we have not only maintained friendly relations, but the terms

upon which we agreed, when deciding to make our side and end lines carried down vertically the dividing limits of our properties, have immensely helped in the development of the Warren district, for when one company has made a discovery, the inspection of this discovery has been open to the officers of its friendly neighbor."

(Mr. J. Parke Channing, at the Washington meeting of the Society [see Bulletin 91, page 311] also called attention to a series of legal documents drawn by the attorneys of four companies in the Miami field, where the same apex provisions were waived, and in their place the companies agreed to accept as the dividing limits of the properties vertical planes along side and end lines.—SEC.)

George S. Rice.—I take this occasion to mention informally that the statements, appearing in various journals, that the Bureau of Mines originated or was responsible for the bill on the revision of the mining laws, which was introduced by the House Mining Committee, are erroneous.

The committee asked for help in formulating a bill, but Director Manning did not think it wise to permit the Bureau to take part in an acute controversy regarding legislation not having to do with safety or health in the mining industry. The committee then asked the help of the Bureau's legal adviser; Mr. Manning consented to his giving help, with the distinct understanding that Judge Thompson would give it only in his capacity as a private citizen, and that whatever action resulted, the bill must not be considered to be a measure either initiated or approved by the Bureau. Accordingly, no members of the Bureau's staff, other than Judge Thompson, knew what had been done until the bill had been reported.

I do not know whether the Judge's opinions had influence in formulating the Mining Committee's bill, but I am sure that all the mining engineers of the Bureau, in their private capacities, would be a unit in disproving the present apex laws and in favoring vertical side boundaries.

COUNCIL.

Meeting of March 16, 1916.

A meeting of the council was held at the office of the President, 52 William Street, New York, on March 16. Members present were Messrs. Finlay, Ingalls, Stone, Penrose, and Huntoon, a total of five, this constituting a quorum.

Minutes of the previous meeting, Jan. 21, 1916, having been

distributed to all members of the council, were approved, with a slight verbal correction.

National Defense.—The correspondence received from Mr. L. S. Austin, recommending that the Society take up for discussion the subject of national defense, was presented by the Secretary. The Secretary was requested by the council to write Mr. Austin advising him that since the American Institute of Mining Engineers had appointed a committee of representative mining engineers to serve on the Naval Consulting Board, the council considers that the Mining and Metallurgical Society might accomplish more by confining its discussion to the revision of the present mining law.

Mining Law.—The President reported that he had recently interviewed Senator Smoot as to the advisability of the Mining and Metallurgical Society's drafting bill for the revision of the mining law. Senator Smoot recommended that the members of the Society discuss such a revision and that the Committee on Mining Law draft a bill for presentation to Congress. Mr. Finlay was requested to correspond with Mr. H. V. Winchell, chairman of the Committee on Mining Law, and make arrangements for starting a discussion without delay and the drafting of a bill to be presented to Congress, as recommended by Senator Smoot.

A letter received by the Secretary from the Hon. Carl Hayden of the House of Representatives was read, and the Secretary was requested to write Mr. Hayden thanking him for calling attention to H. R. Bill 12,426, proposing to authorize mining for metalliferous minerals on Indian reservations in the State of Arizona, and H. R. Bill 12,275, proposing to revise, amend and codify the sections of the Revised Statutes of the United States relating to the location of mining claims on the public domain, and for other purposes; and to advise Mr. Hayden that these bills will be discussed in connection with the revision of the general mining law.

New York Office.—In discussing the advisability of the Mining and Metallurgical Society's opening a suite of offices for the benefit of its members, the council decided to lay this matter on the table temporarily.

Joseph A. Holmes Safety Association.—As the Secretary had not received a final report on the meeting of March 4, at which time an executive committee was appointed, this matter was laid on the table to be discussed at a later meeting. Mr. Penrose signified his willingness to read the minutes and the correspondence, when received, and to report to the council.

Meeting of April 24, 1916.

A meeting of the Council was held at the Lawyers' Club, New York, on Monday, April 24, at which time the program for amendment of the present mining laws of the United States, as presented before the New York section at its meeting on April 19, was submitted by Mr. W. R. Ingalls, together with amendments offered by members of that section. The recommendations received from the New York section are printed below.

The following outline of the main provisions regarded as necessary for the improvement of the United States mineral-land law is intended to give, not the precise legal phraseology to be used, but the objects to be secured; and it is understood that in the proposed legislation all existing or vested rights shall be recognized and also that all provisions of the present United States statutes and department regulations not conflicting with the new statute shall remain in full force, unaffected thereby. This includes Section 2,319 of the Revised Statutes, declaring all valuable mineral deposits in lands belonging to the United States to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, etc.

The new legislation proposed is to secure the following principal changes:

I. The survey of the public lands to be completed as soon as possible and all surveyed lands to be classified as mineral or nonmineral according to the meaning of these terms now established by the United States statute or judicial decisions; such classification, officially announced, to be final until subsequently changed by the Government, and no such subsequent change to affect the rights of location under the former classification. Lands thus designated as mineral to be open to the location of mineral claims only and lands designated as nonmineral not to be open to the location of mineral claims.

II. Mineral claims hereafter located to be 660 ft. square—that is, 10 acres in size and square in form—with boundaries running N and S and E and W. Such claims, when located on surveyed land, shall be subdivisions of the surveyed sections.

Note—This area is about the same as that of the 300x1,500-ft. claims of Colorado. The location would be, of course, subject to all prior rights, surface or underground; and in many districts, claims already located may leave only remnants of area not suitable in size or shape for separate locations. In such cases the practice now authorized by the Supreme Court, of establishing "imaginary boundaries"—that is, of claiming the full area of a claim and then disclaiming the parts of that area already occupied—would be followed. If such a location has

no extralateral rights, it will cause no special trouble. The purpose of this provision is, so far as existing rights do not prevent, to make mineral claims as easy to define as agricultural ones.

III. Any number of claims to be located by one person or association; and upon lands already surveyed and officially classified as mineral, the actual discovery of a valuable deposit not to be necessary to a valid location. Existing regulations concerning the marking, notice and record of location to be continued, with the additional requirement that within one year after the date of location record thereof shall be made in the United States Land Office of the land district.

IV. The present requirement of $100 annual work upon each claim, to be amended by providing that $100 per claim may be paid annually into the United States Land Office in lieu of the performance of such work. A person or association holding a group of contiguous claims to be permitted to do the assessment work upon one claim and thereby hold the group, but such work to be of amount equivalent to $100 for each claim of the group. If any person or association perform assessment work in any one year to the value of $100, or more, in excess of what is required to be done in any one year, the excess may be applied to succeeding years, provided, however, that no fractions of $100 shall be considered for this purpose. Proceedings for patent to remain as now.

V. Subject to the existing extralateral rights of mining claimants or patentees, the holder or patentee of a mining claim located hereafter to have the exclusive right of possession and enjoyment of the surface held by him and of the minerals under it, bounded by vertical planes passing through surface boundaries of said land, but not the right to follow any mineral deposit beyond said planes. And the holders or patentees of claims heretofore located to have similar exclusive possession of all the mineral in claims not covered by any existing extralateral rights.

VI. Notice of location of all mining claims, made after the date of the passage of this Act, must be filed for record with the register and receiver of the land district within which the lands are situated within one year from the date of each location, and unless final entry and payment be made for such claims within seven years after date of location, exclusive of the time covered by pending adverse claims, all rights thereunder shall cease.

During a prolonged discussion of the foregoing memorandum, it was voted to rewrite the last sentence of Article 1 as follows:

Land thus designated as mineral to be open to the location of mineral claims only, and land designated as nonmineral not to be opened to the location of mineral claims unless land designated as nonmineral be proved to contain mineral.

In making this addition, it was contemplated that there would

have to be a definition of "mineral." The idea of the meeting was to provide means for the location of mineral claims on unoccupied lands classified as "nonmineral," if "mineral" should actually be found therein; moreover, to provide for the location of claims on public lands that have not yet been classified.

Article 2 was amended so as to make mineral claims 1,320 feet square; that is, 40 acres.

Article 4 was amended so as to make the annual assessment work $200 on a 40-acre claim, with the proviso that $300 per claim may be paid annually into the United States land office in lieu of the performance of such work.

The last sentence of Article 5 was rewritten as follows:

> And the holders or patentees of claims heretofore located to have similar exclusive possession of all the mineral in said claims that is not covered by any existing extralateral rights.

Article 5 as drafted and amended abolishes extralateral rights in so far as any claims hereafter to be located are concerned. The extralateral rights of existing claims may not be taken away, however, wherefore any new location and grant of patent may be made only with the reservation of such rights. The rights of existing claims having been thus expressly preserved, the last sentence of this article confers upon previously located claims the rights to everything comprised within the vertical projection downward of their side lines that is not legally claimed by anybody else, this being thus an addition to the original extralateral rights.

On motion, duly seconded, the Council voted:

(1) That the memorandum for reform of the mineral-land laws, adopted by the New York section and reported to the Council, be referred to the Society's Committee on Mining Law.

(2) That the said memorandum be sent to all of the organizations that were invited to participate in the Convention at Washington, Dec. 16, 1915, with request that they discuss its terms and communicate with the Secretary of this Society; also to Senators Smoot, Walsh and Thomas; also to the directors of the U. S. Geological Survey and the U. S. Bureau of Mines.

(3) That the above memorandum be immediately released for publication in the press.

(4) That these communications be made in the form submitted herewith, calling special attention to the present action being that of the New York section and not of the Society.

MEETINGS OF SECTIONS.

NEW YORK.

March 16, 1916.

At the meeting of the New York Section on March 16, noted briefly in Bulletin 94, the topic for discussion was "The Relation of Patent Law to the Metallurgical Industry." The most important contribution was the following paper, written by Mr. J. M. Hyde, and read by H. W. Du Bois.

The Need of a Change in the Patent Law*

James M. Hyde.—In order to promote the invention and adoption of such improvements as are necessary to the best development of the industrial arts, our Government early adopted the policy of granting monopolies in the use of such improvements to inventors for a period of years. This policy is based upon the assumption that the profit to be gained from the exploitation of an invention will act as a stimulus to those who have inventive capacity, inspiring them to devote their time and resources to devising and perfecting improvements in apparatus and processes valuable in the arts and sciences. By causing them to make public the details of their inventions, when the patent expires it is expected that the public may have full knowledge of the invention and may therefore be able to make use of the same. It is supposed, however, that the possession of the temporary monopoly will make it possible for the inventor, either by his own efforts or by the efforts of others, to reap such profits from his invention as to warrant the expenditure of the time and money necessary to foster the general adoption of the invention.

As our system now works out, a patent does not, in fact, establish its possessor in a monopoly of his invention. One of our greatest inventors, Thomas A. Edison, is credited with the statement that "a United States patent is nothing more than an introduction to the highest courts of the land," and anyone who has been introduced into that exclusive society realizes the expense which such an introduction entails.

The present position as regards a patent is, in brief, about as follows: When one has devised some method or apparatus that he conceives to be new and of such possible value as to warrant obtaining a patent upon it, he obtains the services of a patent attorney to assist him in the proper filing of his papers and the presentation of his case before the United States Patent Office. For some time past, the standard cost of obtaining a patent has

* First published in *Mining and Scientific Press,* April 15, 1916.

been $75. Of this amount $35 must be paid to the Patent Office in fees and $40 is paid to the patent attorney for his services. The ease with which patents may be obtained is indicated by the meagerness of the patent attorney's fee, and by the further fact that many firms of attorneys guarantee to obtain a patent or to make no charge for their services. They are entirely safe in doing this, as it is practically always possible to make some modification of an idea, deviating in some slight degree from anything done in the past, so that it will be patentable, even though it may be of no value. The patent obtained may not in any way cover the apparatus or process that will actually be used or marketed by the alleged inventor, but he nevertheless may obtain a patent or series of patents upon which to base claims of patent rights and give him so-called "talking points."

When the inventor has obtained a patent he has no means of preventing the infringement of it except by suing the alleged infringer in a U. S. District Court. Likewise, an individual who believes that a patent is invalid and wishes to challenge its validity has no means of doing so except by infringing the patent and permitting himself to be sued for infringement. If the trial of the issue in the District Court were finally to settle the question of the validity of the patent, the system that is now in use would not be so onerous; but, unless the parties to the suit compromise the issue after the case is decided by the District Court, the case is almost certain to be appealed to a United States Circuit Court of Appeals, if rights of great value are involved. If the decision of the Circuit Court of Appeals does not lead the litigants to come to an agreement, the defeated side will usually apply for a re-hearing of the case, and if that be denied will appeal to the United States Supreme Court, which fortunately rarely entertains such issues unless a new suit for an infringement has been brought in a different District Court, and appealed to a different Circuit Court of Appeals which has granted a different decision from the Circuit Court of Appeals that first passed upon the case.

There is no one court in which patent cases are heard and which finally passes upon and disposes of them. Infringement suits may be filed in any of the Federal District Courts in the United States, and a patent involving valuable rights is generally made the basis of suits in at least two District Courts and two Circuit Courts of Appeals if one or the other of the litigants is particularly litigious.

Because of the use of high-priced attorneys and expert witnesses on each side, the compilation of elaborate printed records and briefs, the adroit handling of the technicalities of the law, and the necessity of finding a date for the hearings upon the calendars of courts crowded with other matters, the decision as to

whether an alleged invention is really patentable may be made to consume years of time and involve enormous expense. Such a system defeats the very purpose of the patent law, which is to foster the rapid development of industry. No adverse criticism of our courts is intended by this statement. The courts do the best they can with a situation of which they are in no sense the creators.

The Patent Office was instituted to determine whether or not alleged inventions are entitled to governmental protection, and to issue patents to those who are entitled to them. It should be the duty of the Patent Office, and of the Patent Office alone, to pass upon the patentability of alleged inventions. The Patent Office is not now so constituted and empowered that it can properly perform this, its only proper, function. The changes in its organization that must be made to enable it fully to perform its true function must be enacted into law by Congress, and will be so enacted by Congress only when that body is persuaded that the interests of the country demand it.

Among the changes that have been proposed by those who realize that our present system, instead of fostering the development of industry, places almost insurmountable obstacles in the way of the development of industry, the extreme proposal upon one side is that the search made by the Patent Office shall be so thorough and complete that a patent, when granted, shall in itself be *prima facie,* incontrovertible evidence of the right of the patentee to the monopoly alleged to be granted by the patent. This proposal naturally is popular with many inventors, with certain members of Congress, and with certain other individuals who have little real knowledge of the difficulties encountered in the just administration of a patent system. The alternative extreme view is that the Patent Office should combine the functions of a bureau of records, in which the inventor may record what he conceives to be the essence and extent of his invention and the date upon which his invention has been made, and of an office that shall finally grant a patent only after the patent has been passed upon by the Courts, before which the patentee defending his patent and an interested party contending against the granting of the patent shall have fought out the issue. This proposal is based upon the assumption, which is undoubtedly true, that such an investigation as will determine whether or not an alleged new invention is really novel, the invention of the alleged inventor, and properly entitled to the protection of a patent, can be made only when a contest takes place in which the patentability of the invention is defended and attacked by contending parties having much at stake. The truth of this assumption should not be taken to mean that no patent is to be granted

until the full gamut of the Federal Courts has been run, as is now necessary. It is natural that this solution of the problem has been brought forward by a patent attorney.

The first of these two propositions, namely, that the Patent Office should grant a patent which when once granted shall be unassailable, is untenable because it is absolutely impossible that any investigation depending upon a search in printed records alone, and more particularly in the records of the United States and other Patent Offices, can ever determine that an alleged new invention has not previously been made known and put to use. Anyone who has ever had occasion to make a technical investigation must realize that if the most expert assistance obtainable were used in such an investigation, the paltry sum of $35, which constitutes the whole Government fee, would be absolutely inadequate to meet the cost of gathering the information desired. The United States Patent Office is reported to have accumulated a large fund from that part of the fee which is charged for patents, and which has not been expended in carrying on the Office work; if this be true, it only confirms the assumption that the investigations now made afford a hopelessly inadequate basis upon which to grant countless absolutely unregulated private monopolies.

So large a part of the arguments with regard to the necessity of the modification of the patent law have been made by inventors or patent attorneys that the rights of the public have at times been almost overlooked. There are no more fundamental human rights than the right of the individual to use for his own benefit all of the knowledge that he may possess; and the right of the State to control and even curtail the rights of the individual in the interest of the rights of the whole public.

A patent is a monopoly granted to an individual for the exclusive right to the manufacture and use of an improvement for a fixed period of time. Concurrently, it is a denial of the right of the public to make free and unrestricted use of such improvement during the life of the patent. Our experience during the past few years has so clearly demonstrated the extent to which the public may suffer from unrestricted private monopolies that we have adopted, as a governmental policy, the curtailment of the development of monopolies and the careful governmental regulation of such monopolies, or near monopolies, as are permitted to exist. It is indeed remarkable that, in the face of the prohibition, or careful supervision, of monopolies as a well accepted governmental policy, our Government is itself, through the Patent Office, in a hit-or-miss fashion, annually creating thousands of absolutely unregulated monopolies of the most val-

uable kind—the improvements in the arts and sciences that are the very foundation of material progress. To deny or curtail the right of the public to the free use of an improvement in the arts is a very grave matter, and should never be done on inadequate evidence.

The law provides that a patent may be granted to the inventor covering the use, manufacture, or sale of an improvement of apparatus or process. Evidently this is done upon the assumption that the inventor has rendered a benefit to the State by perfecting his invention and making the invention known in its essential details to the public. By many inventors and patent attorneys it is claimed that the rights of the public are not abridged by a patent, as the invention is a thing that did not exist until it was invented by the patentee and in which the public could consequently have had no rights. The history of patent litigation shows that the Patent Office frequently grants to individuals monopolies of that which is already the property of the public; and experience has shown that while certain inventions are attained only after the most careful study and the exercise of great technical knowledge and ingenuity, probably the majority of the improvements made in the arts are the direct outcome of that which has been done before, the logical and necessary next step forward that would be taken by any of a number of minds dealing with that art. Improvements of this kind should be distinguished from those requiring the exercise of real inventive ingenuity. Industrial work becomes involved to an absurd degree, when every minor and obvious improvement can be made the subject-matter of a patent.

Fortunately, it is not the universal practice of those engaged in the applied arts to take out patents upon all of the improvements in machines and processes devised and used by them; consequently, the records of a Patent Office cannot be a complete record of all the improvements that have been made in the arts. Similarly, although our great body of technical literature is more and more being made a record of the details of machines and practices in use, there are, nevertheless, many improvements in machines and processes that have not been described in technical journals, even though they have come into regular use. It is therefore impossible that the Patent Office can ever be expected to make such a complete search as actually to determine that an alleged invention is so certainly novel that its inventor is entitled to a patent which when once granted can never be challenged. We know, through the fact that many of the patents granted by the Patent Office are held to be invalid by the courts, that the search now made is an absolutely inade-

quate basis upon which to abridge the right of the public to make free use of a useful apparatus or process.

It is obvious that the solution of our problem is not to be found in having the Patent Office grant irrevocable patents on the basis of its own unaided investigations.

In certain countries, every application for a patent is published and everyone having rights which he considers would be unjustly curtailed is permitted to file a protest against the issuance of the patent. In Germany, where this system is used, the exact subject-matter of a patent which is causing years of most costly litigation in this country was embodied in an application for a patent which was contested and after a very brief hearing was refused by the German Patent Office.

While the publication of applications for patents would protect the interests of the public to some extent, even this added precaution would not warrant the granting of irrevocable patents, as it would be very likely that no one would be sufficiently alert to object to the issuance of all of the patents that are not novel, for reasons which do not appear in the materials referred to by the Patent Office.

As has been previously stated, it is possible, under our present system, that before the validity of a patent can be finally determined, litigation may have proceeded for many years. There have been cases where a patent was not finally held to be valid until within a few months of the time when it expired. This lengthy litigation is extremely costly. It is so costly that a poor inventor cannot possibly maintain his own rights in court without assistance, assistance which usually means the assignment of a great part of the profit possibly to be derived from his invention to those who will uphold his rights. The system as now administered does not fully promote the rapid development and adoption of improvements. Many a man is diverted from the exercise of his inventive talent by the fact that he knows that, if he expends the time and money necessary to perfect valuable inventions, he will, if poor, be absolutely at the mercy of those who possess more means and thereby dare infringe his rights, and of those who possess more means to defend his rights and can therefore deprive him of the ownership of his invention in return for the money necessary to defend it. Even where the inventor has the temerity to perfect his invention and go to the expense of patenting it, our present system makes it difficult for him to get his invention adopted, as the uncertainties as to the status of a new patent and the cost of defending it will prevent many who could profit from the use of an invention from adopting it. The second alternative position originally stated, that is, that patents be granted only after they have

been litigated, cannot be upheld if the decision with regard to the granting of the patent is to be based upon fighting out the issue before our Federal courts, as is now done.

What we need most is to get away from the cost and lengthy delays involved in fighting through all the Federal courts of the land to decide whether or not an alleged inventor is entitled to a patent for an alleged invention. There is no reason why the Patent Office cannot be so amplified and empowered that it will finally, expeditiously, and economically dispose of all questions as to the patentability of inventions. It is the logical function of the Patent Office to do this one thing.

Usually it takes but a few hours at the most to explain thoroughly and convincingly, to a man of technical and legal training, the issues of a case which will take several years and the expenditure of a fortune to determine in the law-courts. This is highly uneconomic and absolutely opposed to the best interests of the State, the interest of which can only be fostered by doing all that is possible to promote the perfection of industrial improvements and their rapid adoption. An office which would quickly and finally determine the validity of patents, and grant patents that, when once issued, would be unassailable evidence in determining rights in the Civil courts, would protect all who have legitimate interests and thereby foster the most rapid material development of the State. At the present time patents are annually granted by thousands and it is absolutely impossible for anyone to determine whether or not a patent is valid or exactly what it can be held to cover, until a lengthy course of litigation has been gone through. This is nothing but governmentally created confusion, and a businesslike people, used to handling its affairs with sanity and dispatch, should not endure the continuance of such a system but should bring about the adoption of one by which matters of such importance can be settled with ordinary business dispatch.

A careful study of the situation created by our present system, which may have fitted a day when inventions were few and simple, but is entirely unsuited to the present complex of industry, has made it apparent that a few simple modifications would remove most of the unnecessary evils.

As a search is necessary, both in the interests of the inventor and of the public, a search should be made, but it should be much more exhaustive and more prompt than is now the practice. To facilitate this work the Patent Office should have more adequate quarters, better library facilities, and a larger staff. If it is necessary to charge a higher fee to enable the Office to do its work better, it should be done. Such salaries should be paid to the examiners and assistant examiners as to retain more

highly trained men in the service. The force of each division of the Office should be kept at such a point that not more than a month at the most should elapse between the time an application is filed and the first report upon it is mailed to the inventor. These things are necessary in the interest of the inventor, so that he may learn as promptly as possible whether or not it is probably worth his while to continue his work in perfecting and patenting his invention. The patent, issued after the best possible office search has been made, should be tacitly considered to be tentative, which is all that a patent as now granted is in reality. It should have a status differing from that now given to a patent, in that no injunction should be based upon a patent and no damages should possibly accrue from the infringement of a patent until its validity has been finally established.

It should be the policy of the Patent Office not to grant patents upon such differences in process and apparatus as would naturally be made by a skillful operator. Our present confusion results in part from the fact that patents are freely issued on obvious and minor deviations from practice, and later, after costly litigation, are properly held by the Courts to cover only such modifications as one skilled in the art would be expected to make, and are hence not patentable. The examiners need to be thoroughly impressed with the fact that while the inventor should be allowed all that he is justly entitled to, it is their duty also to see that the rights of the public are not unjustly abridged or jeopardized.

As it is inherent in the nature of the case that a final determination as to the patentability of an invention can be reached only when there is an incentive for those whose rights may be abridged by the patent to maintain their rights with vigor, and for the applicant for the patent to do the same, and as it is the proper function of the Patent Office to investigate the patentability of alleged inventions and grant patents when they are deserved, a Patent Court should be an integral part of the Patent Office, and all questions as to the patentability of improvements should be cheaply, promptly, and finally determined by this court.

The judges of this Patent Court should be so adequately paid that their continuance in the Government service would be assured. They should be men familiar with the patent law and of such technical training and experience as to be able to comprehend the technical issues coming before them. The rules governing the conduct of cases before the Patent Court should be extremely simple. The rules governing the California Railroad Commission, which is able to turn out an amount of work never approached by the law-courts, because it does not permit

of elaborate and involved procedure, could well be made a model for the rules governing the conduct of cases in the Patent Court. The procedure should be so simple that it would be possible for any inventor personally to represent his own case. If any expert testimony should be found necessary for the clarification of issues being tried before the Court, the Court should appoint its own expert to investigate and report. The system of expert-witnesses now in vogue is absolutely indefensible.

Such a court as that which has been herein proposed should be able to dispose of practically every case in one hearing. It would be constituted of men to whom neither the patent law nor the nature of the technical questions involved in a patent suit would have to be interpreted, and who would, because of their expert knowledge and experience, determine promptly where justice lay.

The decision of this Court as to matters of fact should be final and no appeal from its decision should be possible save as to interpretations of the patent law, and the Appellate Court to which such matters might possibly be submitted should also be an integral part of the Patent Office and should be the court of last resort for all questions concerning the patentability of inventions.

It should be possible to bring the question of the validity of a patent before this Court, either by a suit for infringement or by a petition to have the patent declared invalid for reasons properly set forth. In either case, anyone desiring to be heard should be permitted to submit evidence, as it is not always to the interest of contending inventors to present all of the evidence which is obtainable.

The majority of patents are of so little consequence that they would probably never come before this Court. Its membership should, however, be sufficiently large, consisting of men of sufficiently diverse technical and legal training, and so distributed into divisions sitting independently in Washington or elsewhere, that all questions would be disposed of by it promptly; and it should be specifically provided, that whenever the Patent Court had so much work to do that cases could not receive prompt attention, more judges should be appointed, as it is absolutely necessary to the interests of industry that matters of this kind be decided promptly. It is entirely prejudicial to the interests of the State to have the adoption of an invention delayed unnecessarily; and no greater financial loss can be inflicted upon an inventor than to deprive him of the enjoyment of the profit of his invention during a considerable part of the period for which his patent is granted.

Those who profit by our present system have usually been

well represented before the congressional committees investigating the necessity of the modifications of the patent law. If the rights of the public are to be protected, it is necessary that the attention of the individual members of Congress be drawn to the radical changes in patent law which are needed, and that committees representing the great technical societies should go before the patent committees of both houses of Congress to urge the adoption of the changes necessary if the interests of the public are to be safeguarded.

Following the reading of Mr. Hyde's paper, a spirited discussion occurred, dealing mainly with the defects encountered in the judicial interpretation of the United States Patent Laws, particularly in those cases relating to flotation processes.

Mr. Du Bois expressed a not very flattering opinion as to the erudition of some courts on technical matters, and as to the anomalies that are often observed in conflicting expert testimony.

Mr. Johnson deplored the facility with which a shrewd attorney can keep a patent case pending in the courts for a length of time reaching, in some instances, to several years.

Mr. Sussman explained that, in Germany, actual operation of a machine is a prerequisite to the obtaining of a patent.

Mr. Du Bois stated that in Japan no patents for flotation process are permitted, on the ground that such processes are of public utility, as tending towards conservation of national resources.

Mr. Finlay asked whether the same ground had not been taken in the United States, in the case of the Minerals Separation Co. vs. Butte & Superior Copper Co. He also questioned whether the McArthur-Forrest cyanide process had ever been judicially recognized in the United States, and was answered by Mr. Ingalls, who explained that cases involving this process had never come to trial in the United States.

Mr. Stone, on being asked as to the volume of patent litigation, replied that only one-tenth of one per cent. of United States patents are brought before the courts.

Professor Lewis criticized the present method of taking expert testimony in technical cases, and suggested that the appointment of a commission of scientific men by the court would facilitate the arrival at just verdicts, and would remove much of the obloquy under which the expert witness is now laboring. Mr. Finlay assented to this suggestion.

After further scattered discussion, the meeting adjourned.

April 19, 1916.

The April meeting of the New York Section was held at the Engineers' Club on Wednesday evening, April 19, Mr. A. H. Rogers, vice-chairman, presiding. The following members and guests were present: S. H. Ball, Percy E. Barbour, V. M. Braschi, J. L. Bruce, H. L. Carr, H. S. Coe, A. S. Dwight, J. R. Finlay, H. W. Gepp, L. D. Huntoon, W. R. Ingalls, J. H. Janeway, S. J. Jennings, W. Mc A. Johnson, D. M. Liddell, J. W. Mercer, H. S. Munroe, R. H. Parker, Robert Peele, R. S. Rainsford, R. M. Raymond, A. H. Rogers, W. L. Saunders, F. F. Sharpless, E. G. Spilsbury, J. H. Sussmann, Otto Sussman, G. O. Smith, J. A. van Mater, Ralph Williams and H. C. Wilmot.

The subject discussed was the revision of the mineral land law. A printed memorandum was distributed among the members present, which memorandum will be found under minutes of a Council meeting on a previous page. D. M. LIDDELL,

Secretary.

MEMBERS ELECTED IN APRIL.

Borcherdt, Walter O. .....Austinville, Va.
Supt. The Bertha Mineral Co.

Burall, Frederick P. .....Dawson, Yukon Territory, Canada
Mining Engineer.

Carpenter, Alvin B. .508 Union League Bldg, Los, Angeles, Cal.
Mining Engineer.

Douglas, Walter .....99 John Street, New York
Gen. Mgr. Phelps, Dodge & Co.

Godshall, Lincoln D. .....2892 Sunset Pl., Los Angeles, Cal.
V. P. in charge of operations of Tecopa Cons. Min. Co. and Tecopa Railroad Co.

Macnutt, Charles H. .....Namtu, N. S. S., Burma
Resident Mgr., Burma Mines, Ltd.

Sinn, Francis P. .....365 Columbia Ave., Palmerton, Pa.
Supt. Palmerton Works, N. J. Zinc Co.

Taylor, Samuel A. .....506 2nd Nat. Bank Bldg. Pittsburgh, Pa.
Pres. Mgr. and Engr. Crescent Coal Co., etc.

CHANGES OF ADDRESS.

Hardinge, H. W. .....120 Broadway, New York
Jackling, D. C. .....1800 Hobart Bldg., San Francisco, Cal.
Munro, C. H. .....417 Hobart Bldg., San Francisco, Cal.
Munroe, Prof. Henry S. .....Litchfield, Conn.
Spaulding, Morril B. .....528 East End Ave., Pittsburgh, Pa.
Young, Prof. Geo. J. ...827 Guerrero Street, San Francisco, Cal.

PERSONALS.

Frederick P. Burrall is leaving for the Yukon.

H. W. Turner is in Utah on professional work.

A. H. Wethey is doing Red Cross work in Europe.

H. Foster Bain is on his way to Johannesburg to study conditions on the Rand.

S. F. Shaw is visiting the Nevada Consolidated property at McGill, Nev.

J. Parke Channing, C. R. Corning and Charles F. Rand, of New York, are taking a vacation together in Cuba, and will return to New York about the end of April.

STANDING COMMITTEES

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L. D. Huntoon
A. S. Dwight
Geo. C. Stone
W. Lindgren

Annual Medal

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Arthur L. Walker

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Welfare of Mine and Metallurgical Employees

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F. W. Smith
C. W. Goodale
M. L. Requa
S. W. Mudd
Albert Burch

Delegates to Cooperative Committee on Mining Law

H. V. Winchell
J. Parke Channing
R. A. Parker
S. W. Mudd
M. L. Requa

PAST PRESIDENTS

Henry S. Munroe.....1908-1909
Henry M. Chance.....1913
W. R. Ingalls.....1915
J. Parke Channing....1910-1912
James F. Kemp.....1914

FORMER SECRETARIES

J. R. Finlay 1908-1909
W. R. Ingalls.....1911-1914
Henry S. Munroe 1910
F. F. Sharpless.....1915

ANNUAL MEDAL

1914 { Herbert C. Hoover / Lou Henry Hoover
1915 Robert H. Richards
1916 James F. Kemp

Mining and Metallurgical Society *of* America

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Waldemar Lindgren, Boston.....Retires January, 1917
L. D. Huntoon, New York.....Retires January, 1917

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George C. Stone, New York.....Retires January, 1918
W. R. Ingalls, New York.....Retires January, 1919

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Hennen Jennings, Washington.....Retires January, 1917
R. A. F. Penrose, Philadelphia.....Retires January, 1919

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P. N. Moore, St. Louis.....Retires January, 1917

District 8—Colorado and Utah.

Philip Argall, Denver.....Retires January, 1918

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M. L. Requa, San Francisco.....Retires January, 1918
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	D. M. Liddell, *Secretary.*	

Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. May 31, 1916 No. 5

ANNOUNCEMENTS

New York Section.—The next meeting of the New York section will be held on Thursday, Sept. 21, 1916. Hour and place will be announced later.

Bound Volumes.—The demand for 1915 bound volumes exceeds the number of bulletins reserved for binding. The Secretary will greatly appreciate receiving copies of Bulletin No. 81, Feb. 28, 1915; supplement to Bulletin No. 87, Aug. 31, 1915; and Constitution and By-Laws, March 1, 1915, from members who have ordered bound volumes.

MEETINGS OF SECTIONS

NEW YORK

Meeting of April 19, 1916

A meeting of the New York section, of which a preliminary report was printed in Bulletin 95, was held on April 19, Mr. A. H. Rogers presiding. The subject under discussion was the proposal for revision of the United States mineral-land law.

The Chairman.—We have for our subject this evening the revision of the mining law. You are all familiar with the efforts the Society has made in this direction. Delegates from the Society appeared before the Congressional Committee on Mining, which committee suggested that our Society draw up such a law as we think ought to be passed. The members of our Committee stated that they did not feel competent to do this, and thereupon one of the members of the Congressional Committee, Mr. Foster, drew a bill and introduced it. That bill makes the situation, if possible, worse than under the present laws, and is not worth discussing.

In view of this situation, the Council of the Society has considered it expedient to attempt to frame a bill, and Mr. Ingalls, in co-operation with several others, has drawn up a plan which we

have here for distribution. Mr. Ingalls will now tell us what he has done in that direction, and with the paper before you the matter will be open for general discussion.

Mr. Ingalls.—It is unnecessary to go back over the history of this movement, for you have all been kept well informed with respect to that as we have gone along. Those of us who went to Washington and who appeared before the House Committee on Mines and Mining came away with the idea that there was no hope of getting the committee to assist this movement by authorizing a commission, which previously we had been advocating, but that, on the contrary, it would be necessary for us actually to draw up a bill that could be presented in Congress. We were, however, delayed at first by the relations we had entered into with certain Senators in Washington, who had already done what we asked them, namely, had passed a bill for the appointment of a commission to study this question. They having gone as far as that, we could not with good grace say that we had changed our minds and no longer wanted that to be done, unless they were apprised of the situation and agreed to it.

Consequently, as soon as possible, Mr. Finlay, our President, went to Washington and talked the matter over with Senator Smoot, who said that if we should go ahead and prepare something concrete this would be an excellent thing to do, and that such a plan had his full approval. So this perfectly cleared the atmosphere in that respect.

Then the Council of the Society decided that we should immediately take steps to prepare something constructive. Mr. Winchell, the Chairman of our Mining Law Committee, was naturally asked to do this, but he replied that he was unable to attend to it for the reason that he was on the wing so much. Mr. Finlay appointed me a member of our Mining Law Committee with instructions to promote matters as well as I could, and devise a plan, in collaboration with a distinguished mining engineer, which could be presented here and could be the subject of definite action at this meeting, so as to get some specific ideas before the public in general. The main project at present is to get whatever we propose to do before the public in the fullest possible manner, in order to have the advantage of all kinds of criticism and suggestion.

The distinguished engineer whom I have mentioned has refused, I regret to say, permission for me to mention his name or to credit to him in any way the production that will presently be submitted to you. I hope that later we can bring that about, but before offering this sketch which I am going to make as a motion in this meeting I wish to say that many of us, and

speaking for myself I can say that this is certainly the case, have heretofore had the idea that the drafting of a new mining code which would be an improvement over the present one is a task so complex and so onerous that no one should lightly undertake it, which idea has heretofore deterred us from doing anything of the sort. But since I have lately gone into the matter and have read more carefully the existing mining law of the United States I have been led to change my opinion in that respect, and have come to the conclusion that perhaps this is not going to be so big a job after all. The main cause of my change of mind in that respect has been the conferences that I have had with my distinguished confrere, whom unfortunately I am unable to mention, who pointed out that in trying to formulate a new mining law it is highly desirable to make as few changes from the existing law as possible, to preserve as much as possible the language of the existing law that has been tested and interpreted in hundreds, perhaps in thousands, of our court decisions; in other words, so far as possible, to make use of the language that has been tried and proved.

A few lines from a letter from him may elucidate that idea. I should say, by way of preface, that Senator Smoot has already introduced in the Senate a simple bill abolishing the extra-lateral rights of the present law and making provision for the adequate recording of claims, for which the present law does not provide.

I think Senator Smoot's bill is very good. It retains the phraseology of the present law, thus utilizing the decisions of the courts as to the meaning of terms, etc., and it does no more than abolish the extra-lateral right and add certain administrative regulations not likely to be seriously opposed. By its adoption a great step would be taken toward the reform of the present system, but since you have told me that nothing is likely to be done in the matter at the present session of Congress, and that a general sketch of the proposed reform is desirable for further discussion, I send you herewith a draft of such a statement, which you are to use as you see fit. I think it covers all the points except a few which are as well covered by silence, since they are sufficiently covered in the present law. There is only one with regard to which I am not sure that this is the case, namely, the provision defining tunnel rights. The present tunnel law is bad, but it has been modified a good deal in its effect by legal decisions and the sting is taken out of it if the extra-lateral right be abolished, so that I think that for the purpose of this preliminary statement it might as well be omitted.

I may add that it seems that when we abolish the extra-lateral rights of the present law and, further, abolish the prerequisite of discovery that is to be found in the present law, we automatically remove a great many of its complexities. If discovery be not a prerequisite, there is no longer any necessity for special provisions for tunnel sites, nor for mill sites. The mere statement that in lands that are classified as mineral a claim may

be taken up which gives the holder of that claim the right to everything within the vertical projection of the side lines enables anybody who has need for driving a tunnel, or for locating a mill site, to get the land that he needs; that is, I think, an illustration of the way in which a great many of the complexities of our present law are eliminated by settling upon those simple principles.

This sketch, which was thus drawn up, has been printed for the convenience of the meeting. It is unnecessary to take your time to read these now, as you have them before you and they will be read, undoubtedly, paragraph by paragraph. Bringing the matter formally before the meeting, I move the adoption of these resolutions by this section.

The Chairman.—For purpose of discussion it might be well if the Secretary would read this memorandum, paragraph by paragraph, and after each paragraph any remarks will be in order.

The Secretary:

The following is an outline of the main provisions regarded as necessary for the improvement of the United States mineral-land law. It is intended to give, not the precise legal phraseology to be used, but the objects to be secured; and it is understood that in the proposed legislation all existing or vested rights shall be recognized, and also that all provisions of the present United States statutes and department regulations not conflicting with the new statute shall remain in full force, unaffected thereby. This includes Section 2319 of the Revised Statutes, declaring all valuable mineral deposits in lands belonging to the United States to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, etc.

The new legislation proposed is to secure the following principal changes:

I. The survey of the public lands to be completed as soon as possible and all surveyed lands to be classified as mineral or nonmineral according to the meaning of these terms now established by the United States statute or judicial decisions; such classification, officially announced, to be final until subsequently changed by the Government, and no such subsequent change to affect the rights of location under the former classification. Lands thus designated as mineral to be open to the location of mineral claims only and lands designated as nonmineral not to be open to the location of mineral claims.

Mr. Parker.—Some time ago I encountered a rather interesting situation in Wyoming in connection with coal lands, wherein the Government had denominated certain large areas as non-coal-bearing. However, some parties, not accepting the Geological Survey's dictum, undertook development and opened up merchantable seams of coal in four or five different places. There was a case wherein the Government said the land was practically nonmineral and it was proved later to be of material value. What should we do in a case of that kind?

Mr. Smith.—I think the Government has a right to change its mind, as it often does, whenever these questions of classification come up. It is quite a common occurrence for land that was classified as non-coal to be subsequently classified as coal land on the basis of later discoveries.

Moreover, the opposite is true. There have been many cases where the showing of coal was such that the classification of the land as coal land was extended for too great a distance from the outcrop, and later this classification was found to be in error. I think under present conditions it is very much our policy, speaking for the Interior Department, to change our classifications to agree with fact as promptly as possible, and I think that such revision is contemplated by the wording of this section. We have been very careful, in making such changes as putting a higher valuation on coal land on the basis of the discovery of one or more beds, not to affect the rights already initiated, and that, too, is contemplated by the wording, "and no such subsequent change to affect the rights of location under the former classification."

Where a man has entered upon land at the mineral price, which would be about $20 an acre, and the subsequent classification of not merely that particular 100 acres or that 40 acres, but of the surrounding country, raised the price to perhaps $100 an acre, it is the policy to let him complete his purchase at the price paid for that land at the time of the initiation of his rights. Thus I think this proposal would continue what we think is the necessary practice under the present law. Of course, that relates to coal land, but the same principles ought to apply elsewhere and I believe can apply under this wording.

Mr. Jennings.—I think one difficulty that a great many developers of mineral property encounter is that the Government changes its mind too often on the classification. If you knew that a land classified as mineral land was to remain mineral land, or agricultural land was to be classified as agricultural land, and you could obtain it under either provision, and not be subject to the charge of fraud for doing one or the other, procedure would be simplified. Supposing land were classified by the Government as agricultural land, and you as a developer of mineral found it was mineral land and wanted to buy it as agricultural land; the Government should sell it to you as agricultural land and not utilize your development to change its mind and say you should buy it under mineral-land law if that is more favorable to the Government.

Uncertainty is a strong reason for lack of incentive to the development of anything, and if, when the land is once classified,

the Government will allow it to stay classified we shall know what to do; but if you are subject to a change of mind with the change of an administration or of an official in the Interior Department, you are open to uncertainty which does not tend to the greatest development. Hence I am strongly in favor of the first part of this paragraph, that land shall be classified and shall stay classified.

Mr. Smith.—I don't know how much of a discussion you want here. Some of us have lived day in and day out with some of these questions under existing law, not so much their legal interpretation as their practical working out. I hardly think that Mr. Jennings would wish to go as far as his words will lead him; because when we change our minds it is not for the sake of getting the better of an individual applicant or locator, but for the betterment of the whole community.

Suppose we have classified as agricultural certain lands in one of our Western states. The discovery of mineral is made in the immediate vicinity, which discovery any mining engineer would say affects the classification of the territory within a radius of several miles. I do not believe for a moment that it is to the interest of the mining industry for that land to remain open only to agricultural entry. A rancher would then be free to take a homestead of 360 acres, and exclude a mining man who might wish to take it up for mineral development. If the classification is to be upheld in spite of new evidence or the added light of new discoveries, I think we are working on a wrong basis, which will work a hardship to the mining industry. The same condition would then prevail as at present; a mining venture is sometimes surrounded by persons who are there not for the business of mining, but for the sake of selling out, and in order to protect mining men from fake agriculturists we have had to change certain classifications.

That was the case with a large area which was classified under a special law, because the lands belonged to the Northern Pacific if they were nonmineral, but to the public domain if they were mineral. Our classification of some of these lands as mineral was decidedly in favor of the mining man because it kept the land open to mineral location, entry and patent, instead of letting it go by thousands of acres into the hands of the Northern Pacific. There had been an earlier classification, but the Government did not stand on that classification, because there were mining prospects all over the area. The Northern Pacific in some cases contested our classification, but I am glad to say that in most of such cases we were upheld, and that land is open for mineral discovery and patent today; whereas, if the Govern-

ment had adopted the policy of standing pat, it would be in the hands of the Northern Pacific. In some cases the Northern Pacific had contracted to give such lands over to ranchers and had sold its rights even before it had any patents to the land itself.

I do not believe that we shall get very far if we try to dispose of lands on any basis other than what we know to be their real character, and we must also recognize that some lands have more than one character. There is more than one estate in land. I am very sympathetic with what Mr. Jennings had in mind; cases have occurred in which demands have been made for the Government to change its classification to the harm of somebody on the land. I have no sympathy at all with any such demand. If a man has entered in good faith, whether he be a rancher or a prospector, and has initiated rights, he should be protected to the limit, no matter what the subsequent classification of the surrounding country may be. I think that the proposed wording provides for revision and thus protects all parties in interest.

Mr. Jennings.—The United States Government has earned the reputation of being an "Injun trader" in the disposal of its land. It grants the railroad alternate sections of land if it is nonmineral; decides that certain sections are nonmineral and therefore belong to the railroad. Somebody comes along and says, "Oh, you made a mistake, it is mineral land and should be open to mineral location," and the Government takes the land back on one pretext or another. I call that an act of bad faith on the part of the Government. It doesn't look for that wide and broad development of the country that is necessary to get the best possible results out of it, and I should say that the small amount of benefit that has been derived by unjustly taking away lands granted to the railroads is harmful to the good faith of the United States Government, to the development of the mining industry. Take the case cited by Mr. Smith: the Northern Pacific Railroad thought it legally owned certain sections of land: what difference does it make whether it disposed of it to a rancher or sold it to a mining man? It is going to be developed, and probably it would be developed very much quicker and very much better than if it had been returned to the Government by this changing of classification. I have seen a great deal of harm done to the development of coal lands of the West, where the Government changed its mind as to how land could be located. Perfectly legitimate development has been impeded by bringing prosecutions against people who, when making the locations, were advised by lawyers and officials that a given way was the

only way that the land could be located. It is this change of classification which brings about this uncertainty, which is surely retarding the development of the country.

Mr. Finlay.—We have argued a good deal, but have not yet stated our beliefs. Is it your idea, Mr. Jennings, that we might just as well have no classification, doing away with all differences, or that the Government should make a classification once for all and stick to it?

Mr. Jennings.—One classification, once for all.

Mr. Rogers.—Probably Mr. Smith can tell us to what extent the classification has gone.

Mr. Smith.—We have classified possibly a half of what we believe to be the coal lands of the West (speaking very generally) and we have not made a distinction between mineral lands and agricultural lands in many cases.

I have mentioned an exceptional case, that of the railroad grants, because most of our agricultural land laws now contain a reservation of the mineral; that is, these more recent laws, such as the Enlarged Homestead, and some that are before Congress now, such as the Grazing Bill. They provide for reservation of mineral rights to the Government, for the purpose of entry by prospectors at some later time, and that, I believe, is essential.

This has a direct bearing on this question as to a hard and fast classification into two classes, mineral and nonmineral. If the classification is going to be hard and fast, once for all (I am speaking for the Geological Survey), we shall go mighty slow on classifying land on that basis; and you would do the same if you were in charge or if it were your own land, because if you have no chance to correct your mistakes you are likely to play safe.

But the remedy for that, an idea which Mr. Ingalls and his associates will wish to consider, is the possibility of separating the two estates. We are trying to dispose of large grazing areas in Arizona and Nevada, for instance, under a proposed grazing law, but we are not going to classify that as agricultural and shut out the prospector. We do not wish, by turning it over to this or that rancher in fee simple, to shut out from all of that vast area the prospectors who are going to discover mineral wealth in future decades, as in the past. The classification problem is much more complex than one thinks until he gets up against it, and this should be considered when you speak of the Government's deciding these things. In many of the cases I have referred to, in perhaps a majority of them, the decisions are not between the Government and the Northern Pacific Railroad, but

between rival claimants of the two classes, and it doesn't make a dollar's difference to the Government whether they give it to one or to the other.

Mr. Rainsford.—I would like to ask Mr. Smith what would be the probable action in the case of a party who applies for a patent before the mineral or agricultural character of the land has been determined. I have considerable sympathy with some of the remarks of Mr. Jennings, because I was once unfortunately mixed up in a coal-land deal in which we had some claims to patent. The Government sent a young prosecutor from Washington; they didn't know I was in it, but they indicted everyone else. We offered the first claims on the basis of mineral patents. They were refused, because when our witnesses got into court the attorney for the Government pointed to a spot on the map near the crest of a mountain range and asked the representative of the claim holders whether he would swear there was coal under that place, some 2,000 feet underground. He said, No, that there would possibly be a fault or a pinch in the vein. "You have never seen the coal in there?" "No." "So how can you swear it is mineral coal land?" "Because there is an outcrop some two miles away, and I believe in the permanent character of these coal beds." Our application for patent as coal lands was refused. The Government also refused to let it go to patent as agricultural land. The whole matter had to stand in abeyance until the patience of all parties concerned was exhausted and I had to drop out. I think, however, the proposed phrase, that land shall maintain the same classification that is given to it until changed by the Government, would cover that point. I am asking what happens when one applies for a patent in unclassified land.

Mr. Smith.—I would recommend, in such a case as you cite, that the certificate of mineral character made by the applicant be sustained, and that he be allowed to take the land in default of any more substantial classification.

Mr. Jennings.—I wish to offer an amendment that the words "until subsequently changed by the Government, and no such subsequent change to affect the rights of location under the former classification," be eliminated; the clause would then read, "such classification, officially announced, to be final."

Mr. Finlay.—I also have a good deal of sympathy with what Mr. Jennings says, not because I have had any unfortunate experiences or feel any doubt as to the Government's being able to give title, but because I have never been able to observe that in Michigan or the whole Lake Superior country, or in Missouri, in

both of which states I have had considerable mining experience, the mining industry does not go ahead just as well under agricultural titles as it does under any mineral law.

Mr. Parker.—My object in speaking the first time, irrespective of coal, really had reference to the last two lines of the first paragraph, "lands designated as nonmineral not to be open to the location of mineral claims." That specifically prohibits a prospector from going upon ground that has not been classified as mineral. I would therefore suggest adding the words, "until proved to contain mineral."

Mr. Jennings.—You should also add some words to cover the case of land which had not been classified at all. When the Government once classifies land it ought not change it. Now, as Mr. Smith has very justly pointed out, under that provision classification would go slow. This means that there would be a large amount of unclassified land and any such land should be open to mineral location.

Mr. Smith.—Will you allow just another statement in regard to what Mr. Jennings just said. It isn't a matter of conjecture; this is what actually happened. In some of the Eastern Montana coal areas, where the value of the land as coal land is prospective, although the coal is there and we know where it is and what its B.t.u. value is, we felt obliged to classify it as coal land in spite of the fact that it displaced the ranchers. It came under the legal definition of coal lands; it was workable coal; simply the conditions were not yet quite favorable. There was an immediate demand for that land for grazing purposes, although our classification of it as coal land precluded its agricultural use. Considerable interest was aroused, and I remember the case because pressure was put on me to change the classification. A few years afterwards a law was passed which enabled us to patent the surface rights of coal lands, and that land is now entered and is used for either dry-farming or grazing. The coal is lying there and will probably lie unused for decades. When the time comes, someone will apply to the Government for the coal lands and will simply pay damages to the occupant of the surface.

Mr. Jennings.—Why should not the price of the coal go to the grazing owner?

Mr. Smith.—I think it would be better not to allow the surface owner to have any mineral rights. The law should give only the surface to one who asks for the surface. It should be a limited patent.

Mr. Parker.—Do you suppose that a farmer would give up his mineral rights when he knows that it is proposed to operate for coal? Would he give it up comfortably, easily and nicely?

Mr. Smith.—I don't think he would; therefore it would be better for an applicant for the coal to deal with the Government than to deal with the rancher. It is important for us to get away from the middleman, and that is my objection to their owning mineral land in Minnesota or Michigan and having a chance to sell out later to the mining companies, as contrasted with the Government's practically giving the land away to the mining companies. It is not good economic policy for a mining company to have to pay tribute to a man whose grandfather happened to take up the land. I know it appeals to us as individual Americans, because we like to fall into something valuable that we didn't earn, but would it be for the interest of any mining company to pay tribute to me because my grandfather happened to buy some timber land in the Northern Peninsula?

Mr. Jennings.—I think it is highly important for the citizens of the United States to feel satisfied that the Government is a fair trader, to believe that when it says a thing is so it is going to stick to it, not for this year only, but for all the years to come; and if through fortune or foresight you acquire something valuable it is going to be yours without having someone from the Government in the next administration come and make you defend your title to it.

Mr. Smith.—I believe Mr. Jennings knows I can see two sides of the question, for I have been thought by some members of the Department of Justice to be too prone to take the "anti-Government" side of some of these questions.

Mr. Rainesford.—Why doesn't the Government sell all the land anybody wants to buy, just as an individual does? If I own land in all of the fee, and you come along and want to buy agricultural rights to the surface, I sell them to you, reserving the mineral or the coal rights. Why shouldn't the Government, therefore, sell all of its land in the same way? If a man wishes to locate for agricultural purposes alone, let him pay for that, and let the Government reserve the mining rights. If he says, "I want the mineral rights also," then let him pay for those rights in addition, and thus obtain the entire fee simple to the land?

Mr. Smith.—There is this difference between you as a private landlord and the Government as a land owner. You or I would think first of the price we are to get for our land, but most of us

expect the Government to think, not of the price in dollars, but in terms of development, which means use and the good of the community. Therefore, use of the land should be considered as a large part of the price paid for it, and hence there is danger in giving a man a fee title to coal when there is no immediate prospect of its being used.

Mr. Jennings.—The price you have to pay for mineral land under this provision amounts to $50 an acre. You have to do $500 worth of work for 10 acres—$100 annually for five years. That makes it $50 an acre, in work or money, which strikes me as pretty stiff.

Dr. Sussman.—As a practical question, when we claim land for its mineral rights we have also to provide for surface rights on additional land—that is, we have to arrange for mill-sites and the necessary appurtenances for proper mine operation. If the land is classified, no matter under what classification, and somebody takes it up as a ranch, it is possible to buy your mill-site from the ranch owner; but in case of an area claimed for its mineral rights, which has to be mined by the caving system, you cannot build on that. Under the present law you have no way of taking up the adjacent land which you absolutely need for your industrial works, dumps, etc. This, in our case, caused endless litigation and trouble. Land required for other purposes has to be taken up as mineral land, and this often smacks of fraud, when we really would like to be honest.

Mr. Finlay.—Mr. Smith is really arguing against the cession of mineral lands in fee simple. If we follow this idea far enough, we shall come to the conclusion that the best thing for the Government to do would be not to give an absolute title to any land, including surface and mineral rights, but to cede mineral rights only in process of working; in other words, for a royalty.

Mr. Smith.—Not necessarily a royalty. Make the title contingent on use, not for the sake of tribute but to promote development. Mr. Kirby preached that in Tonopah and got in very bad, but it is a good principle.

(Mr. Jennings' amendment, duly seconded, was now put to vote by the Chairman, and was not carried.)

The Chairman.—The idea of separating the two estates does not seem at all compatible with the wording of this paragraph. If this idea should be favorably acted on, I should think the whole paragraph would have to be rewritten.

Dr. Sussman.—I move that paragraph I be stricken out

entirely, and a paragraph substituted providing that such lands as have not as yet been classified as agricultural or mineral be not classified in future, but that the two estates be divided, into surface and mineral rights, the owner of mineral estates having the right to acquire surface estates by condemnation, where purchase on reasonable terms is impossible.

Surface rights do not necessarily imply use for agricultural purposes only. Such a law prevails in Germany, in Spain, and I think also in France.

Mr. Jennings.—A similar law originally prevailed in South Africa. They had what they called the Bewaarplatzen, a place set aside for the mining companies to deposit their tailings. It was finally proved that the reef dipped underneath this ground and the question then arose as to who owned the undermining rights. The Government claimed that it owned it; the surface-right owner said he had a prior right to it and he wasn't going to remove his tailings nor allow anybody else to mine under him, and it gave cause for a great amount of litigation and discussion. Of course, a compromise was arrived at, by which the Government got its share and the surface-right owner got his share, and the man who developed the property had to bear the burden.

If you should provide that the man who takes the surface rights has a prior claim to the undermining right if he wants to take it, I think this would meet many of the objections I have raised.

Dr. Sussman.—I didn't quite follow you. The owner of the original outcrop knew that the owner of the dumping ground in such a case would have no claim to the lode or any minerals underlying his dumping ground, until he had acquired the mineral rights to the claim.

Mr. Jennings.—The point to be considered was this. A vein dipped at 70° at the outcrop, and at a certain depth it flattened to 30°. You put your mill a mile away from your outcrop and for that purpose you took out a surface right. Now, when you were working up near the outcrop on a dip of 70°, that undermining right a mile away was valueless, because it would be twelve or fifteen thousand feet deep; but with a 30° dip it lay at a depth of three or four thousand feet, or well within mining possibilities, and was a valuable vein. Now, suppose you had all that surface covered 150 feet deep with tailings, and you kept on dumping. You were not going to allow anybody to disturb you in your possession of the surface. You couldn't get at the underground mining rights unless you entered from some other place with an inclined shaft; consequently your surface right

impeded the development of that mineral right and the Government claimed that the mineral right belonged to it.

If you give the man who takes out the surface right a prior right to claim the mining estate, or compel him to cede that right, if he does not desire the mining estate, I think this would be a just law, and would probably meet all objections.

Mr. Ingalls.—The proposition to separate the estates—surface rights and mineral rights—would be so radical a change from our existing system that I do not think there would be the remotest chance of getting a law involving that idea through Congress. I do not think it would be approved by the mining public in general.

It does not seem to me that what Mr. Jennings hoped to accomplish by the motion that was defeated a moment ago, for making classification final, would do what he expected of it. Suppose that his idea were in force, and that land which had been classified as nonmineral had subsequently been found to contain mineral. Following his idea, there would be no opportunity to locate a mineral claim. It does seem to me, however, that provision should be made for the location of claims on lands that have not been definitely classified by the Government.

Mr. Smith.—Yes, I agree that there ought to be an opportunity to do something with unclassified land.

Mr. Jennings.—I do not agree with you at all on the supposition that land classified as nonmineral would not be developed. Just take the state of Texas, for instance, which is practically all classified.

Mr. Ingalls.—The public-land laws of the United States have nothing to do with Texas. Texas was a sovereign state before its admission into the Union.

Mr. Jennings.—Exactly; and that is the reason why mining flourishes there. A man owns grazing land of several hundred thousand acres and you have an idea that there is mineral on it. You go to him and say, "I am willing to put in my time and money to develop mineral on your land. On what basis will you allow me to do it." You at once arrive at a basis which is fair and honorable, and you start developing. I have options at the present time over thousands of acres in Texas that are being developed.

Mr. Ingalls.—That would be a matter of private treaty between you and the owner, exactly as it is done in Minnesota. When the Territory of Oklahoma was admitted as a State, by

act of Congress, the mineral-land laws were made not to apply to Oklahoma. I wish to ask Mr. Smith if there have been any claim locations in Oklahoma.

Mr. Smith.—I do not know of any lands we have had to deal with there except Indian lands, and the Government is a harder person to do business with as trustee of an Indian than in any other capacity.

(Dr. Susmann's amendment, duly seconded, was now put to vote and was not carried.)

Mr. Ingalls.—It seems to me that what the first paragraph needs is some provision for the location of mineral claims on unclassified land, and that Mr. Parker's suggestion in adding to the last sentence, "Lands thus designated as mineral to be open to the location of mineral claims only, and lands designated as non-mineral not to be open to the location of mineral claims unless they be proved to contain mineral," would accomplish this result, providing a definition of "mineral" should be inserted.

Mr. Jennings—Before you close, I would like to understand what Mr. Ingalls and his eminent collaborator had in mind when they mentioned, "by the Government." Do they mean Congress or do they mean the Land Office? If it is to be by Congress, that would absolutely meet my objection, because Congress would never change the classification.

Mr. Smith—I believe classification has been ruled by the courts to be in the province of the Secretary of the Interior. In the Swamp Act it was decided that if the Secretary of the Interior said it was swamp land it was swamp land, whether there was any water on it or not.

Mr. Parker—I move that in the first section of the memorandum submitted to us this evening the last line be amended to read as follows: "not to be open to the location of mineral claims until proved to contain mineral.

Prof. Munroe—Would it not be well to include the right to locate claims in unclassified lands under the same limitation?

Mr. Spilsbury—It seems to me, before adopting this proposed bill, in view of the difference of opinion that has developed, that it would not be advisable for us, as a section, to adopt it as a whole. I think it ought to be referred back to Mr. Ingalls, now that he has heard the expressions of opinion, to be submitted later on in a modified form, rather than that we should adopt it now when there are so many different opinions as to what the result of such action is going to be.

Mr. Ingalls—There is not going to be any question of referring this back to the maker of the motion. In order to get the matter before the public we want to have some action by this section. That action will be far from final. It will not commit the Society in any way. Whatever action is taken by this section will necessarily be acted upon by the Council, which undoubtedly, as a first step, will refer the matter to the Mining Law Committee. The Mining Law Committee will then refer it back to the Council and the Council will then refer to the Society, but we should like to have some action by this section, in order to have the matter formally offered to the public for discussion.

(The first section of the proposed legislation, as amended by Mr. Parker, was now put to vote and was carried.)

Prof. Peele—Mr. Chairman, this discussion has been more or less informal and only the first section has been disposed of, as far as this meeting is concerned, by the last motion. It occurs to me that the amendment which Mr. Parker proposed to the last line of Section I seems to be linked up with the fourth line of Section III, "the actual discovery of a valuable deposit not to be necessary to a valid location." From this it would appear that the discovery of mineral is not necessary for a location.

The Chairman—Not on land classified as mineral. Mr. Parker's amendment referred to lands that were not classified. The Secretary will now read the second paragraph.

The Secretary—

II. Mineral claims hereafter located to be 660 ft. square—that is, 10 acres in size and square in form—with boundaries running N and S and E and W. Such claims, when located on surveyed land, shall be subdivisions of the surveyed sections. (Note—This area is about the same as that of the 300 by 1500-ft. claims of Colorado. The location would be, of course, subject to all prior rights, surface or underground; and in many districts, claims already located may leave only remnants of area not suitable in size or shape for separate locations. In such cases the practice now authorized by the Supreme Court, of establishing "imaginary boundaries"—that is, of claiming the full area of a claim and then disclaiming the parts of that area already occupied—would be followed. If such a location has no extra-lateral rights it will cause no special trouble. The purpose of this provision is, so far as existing rights do not prevent, to make mineral claims as easy to define as agricultural ones.)

Mr. Jennings—I recognize the advantages that are sought to be obtained by the square location, which are great and perfectly apparent, but this proposed location is 10 acres, for which the miner is made to pay twice as much, in either labor or money, as he now pays. I think that is a hardship which should not be imposed upon him, and I would suggest that this paragraph be

amended to read, "Mineral claims hereafter located to be 660 by 1320 ft.," which is 20 acres; or else the subsequent paragraph, requiring $100 per claim annual work, or payment of $100 to the Government, be changed to read $50.

Mr. Ingalls—I think Mr. Jennings' point is a very good one, but my idea is that it will be better taken up in discussing a later section than in talking about the size of the claim. The existing law already specifies 10 acres as the unit of placer claims. The law says that they shall "be not more than 20 acres," but the unit is 10 acres.

> Legal subdivision of 40 acres may be divided into 10-acre tracts and two or more persons or association of persons, having contiguous claims of any size, although such claims may be less than 10 acres, may make joint entry thereof, but no location of a placer claim * * * shall exceed 160 acres (Sec. 2330, Rev. Statutes).

In the note explaining the law, it says:

> Several persons jointly may make a placer location * * * Must not exceed 20 acres for each individual. When placer claims are upon surveyed land they shall conform to legal subdivisions. No such location shall include more than 20 acres for each individual claim.

The Chairman—It seems very desirable to stick to the 10-acre unit, but it might be provided that $100 worth of work would be all that would be required on two claims or less. Confusion would surely result from locating rectangular claims, some of which had the long dimension north and south and some east and west.

Mr. Finlay.—I believe that 10 acres would be too small, and would rather have 40 acres, because one of the difficulties of the present law is that it results in cutting up a mining district into a lot of small ownerships which have to touch each other. Mr. Channing, speaking in Washington, thought they should be 1500 ft. square; I suggested they should be 1320 ft. square, or 40 acres. I make the motion that the claim should be 40 acres, instead of 10 acres.

The Chairman.—Why not let a claimant take up four tens?

Mr. Finlay.—I would discourage 10-acre claims, because, by interlocking, they might make a lot of conflicting ownerships, the bad results of which you see at Cripple Creek or Butte; but even 40 acres is not enough to form a mine under modern conditions.

Mr. Smith.—Keep in mind that you intend to eliminate extra-lateral rights. That is the object of the proposed square location.

Mr. Jennings—But a person can take up as many claims as he wants.

Mr. Finlay.—Perhaps I didn't make myself clear. If the 10-acre claims were taken up in squares, in groups of 40 acres, that would be one thing; if they were taken up separately or touching diagonal corners, then you might find a lot of little 10-acre ownerships in the district, which would be rather hard to consolidate.

Mr. Jennings.—I withdraw my amendment in favor of Mr. Finlay's, which I second.

Mr. Ingalls.—It seems to me that a 40-acre claim is not necessary, because if the unit is 10 acres anybody who would take up a 40-acre square could just as easily take up four tens; but if the unit is made larger, say 40 acres, some provision will be necessary for taking up tunnel sites and mill sites in a special way, which will be automatically taken care of if the unit is only 10 acres.

Mr. Raymond.—Taking up 40 acres obviates the objection we are talking of. It allows for dip and gives just the claim we had before, with its dip for a reasonable distance.

Mr. Ingalls.—If anybody has a chance to take out a 40-acre claim, he has the same chance to take out four tens.

Mr. Finlay.—But what I would like to do is to prevent that. Supposing you make a chain of 10-acre claims with the diagonal corners touching. That is not a good location; it is a poor location economically. Or one might make a series of detached locations. If locations are to be contiguous they should be in squares. If they are to be in squares they ought to be large enough to make good units for economical work.

Mr. Ingalls.—What is the size of claim in Mexico?

Mr. Barbour.—Two and forty-seven-hundredths acres.

Mr. Jennings.—In British Columbia the unit claim is 1500 ft. square. The unit claim in South Africa is 600 x 400 ft. You can take 12 units in one amalgamated claim in South Africa, or about 60 acres, but on each unit you have to pay a monthly license of 62c. when you are not getting out ore, and $15 when you take ore out of it for a year.

Mr. Wilmot.—The new law of the Philippines provides for a claim 1000 x 1000 ft.

Mr. Jennings.—The advantages of the square location are

undoubtedly great. The arguments of Mr. Ingalls that you can take up four 10-acre units if you wish and that the smaller unit will be more convenient for location of mill sites, for which only 10 acres are required and need be paid for, could possibly be satisfied by a provision that on mineral land a minimum of four units, or 40 acres, must be taken up.

(On vote, Mr. Finlay's amendment was accepted, and Section II, as amended, was then adopted.)

The Secretary.—

III. Any number of claims to be located by one person or association; and upon lands already surveyed and officially classified as mineral, the actual discovery of a valuable deposit not to be necessary to a valid location. Existing regulations concerning the marking, notice and record of location to be continued, with the additional requirement that within one year after the date of location record thereof shall be made in the United States Land Office of the land district.

The Chairman.—There may be some opposition to this suggestion. Mr. Foster wanted to provide that only a limited number of claims could be held by one individual.

(Motion to adopt Section III was carried.)

The Secretary.—

IV. The present requirement of $100 annual work upon each claim, to be amended by providing that $100 per claim may be paid annually into the United States Land Office in lieu of the performance of such work. A person or association holding a group of contiguous claims to be permitted to do the assessment work upon one claim and thereby hold the group, but such work to be of amount equivalent to $100 for each claim of the group. If any person or association perform assessment work in any one year to the value of $100, or more, in excess of what is required to be done in any one year, the excess may be applied to succeeding years, provided, however, that no fractions of $100 shall be considered for this purpose. Proceedings for patent to remain as now.

Mr. Smith.—Do you think an amount of $100 in money or $100 in work annually is sufficient to hold a 40-acre claim. That is half the present amount.

Mr. Jennings.—But you have extra-lateral rights under the present claim; the proposed claim has no extra-lateral rights. It is a question whether the two are not equivalent.

Mr. Ball.—Further, you are not likely to get much of a vein on any particular 40-acre claim.

Mr. Smith—Some question might be raised about that new idea of paying the money into the Land Office. I have supported that idea in the past, but it is hard to decide whether it is better to pay money into the United States Treasury than to spend it for

for prospecting. It is probably less desirable for the mining community or the industry to pay money into the Treasury than to put it in the ground.

Mr. Parker.—A local miner does get some benefit, because presumably he is hired. Also the ground is being developed and tested.

Mr. Jennings.—My experience of prospector location work is that probably four-fifths of it is wasted.

Mr. Smith.—Much of the work that we have seen seems to be wasted; but, on the other hand, a mining company which took 40 acres for the purpose of doing something would probably spend $500 in the first year.

Dr. Sussmann.—I do not think the advantage accruing to a company by paying funds in the Treasury would be sufficient to overcome the objection that would oppose this practice in the mining communities. They want this $100 spent in the community and do not want it paid to the Government.

Mr. Jennings.—I know a case in which people located a great number of claims. They were perfectly willing to pay the Government some sixty or seventy thousand dollars a year to control the whole number of claims, but they did not wish to throw away that sum as they would have had to do if they had to work each separate claim.

Mr. Ingalls.—The reason why that provision was put in was this: It was assumed that, normally, anybody would prefer to do the work, but occasionally conditions arise making it difficult to do it. Recently such a condition arose in the Clifton-Morenci district, over which the claim holders were very much exercised; the prescribed time for doing their assessment work happened when they had the strike there, and the strikers would not let their men in. They finally secured an injunction which enabled the work to be done. Situations like that occasionally arise when it is extremely difficult to do the assessment work on a property, and there ought to be some means for meeting that objection.

Mr. Finlay.—Or again, take this case: You contemplate locating a claim on the dip of a lode, the ownership being different from that of the outcrop. Now, $100 worth of work at sinking, or doing something to develop a vein that may be 2000 ft. below the surface, is wasted and might just as well be paid to the Government.

Dr. Sussman.—It seems to me useless to attempt some-

thing, however desirable, which will meet with so much opposition that it can not be put through; I do not think this proposal can ever be passed.

Mr. Smith.—As to the case of a man who has a mining claim down the dip, where the mineral is 2000 ft. below surface, should he too be required to do no work on that claim? I may be a little radical, but I would raise the question: Why has he got that claim? If he belongs to an association or group which owns back to the outcrop, why, he has some right, for he evidently means business; but as to a man who is simply dealing in the future, I haven't any sympathy for measures making his life easy. One who has no part in the actual mining at a particular area today, who is simply waiting for somebody to get near enough to him to buy him out, is one of those squatters who are holding up so much of the development in our Western camps.

Mr. Spilsbury.—Suppose a man comes to a new camp, where an outcrop has been defined, and a location of 40 acres has been placed on it. The dip of that vein, we will say, is east. If he, right in the beginning, before that question has been definitely determined, thinks the dip is to the east, and he locates the next 40 acres to the east, of course he will not get that vein except at a considerable depth, but hasn't he the right to locate that claim and hold it?

Mr. Smith.—I'd rather see him in combination with the owners of the adjacent property, because it can be better developed as one property than two properties.

Mr. Spilsbury.—All right; then he has the right to sell it to the other people. I think that a man who has foresight enough to locate his claim where the veins are going to be at a depth, has the right later on to form a company, and put down a thousand-foot hole and mine the orebody from his property.

Mr. Raymond.—I move that $100 be amended to $200 per 40-acre plot.

Mr. Ingalls.—Remembering that we wish to adhere as closely as possible to the existing law, it seems to me that Prof. Raymond's suggestion is a good one. Mr. Carr has just suggested that if anybody does not wish or is unable to do the assessment work he should pay $300 to the Government in lieu of $200 worth of work.

(This amendment accepted by Professor Raymond.)

Mr. Huntoon.—A serious objection is going to be made to the clause permitting mining locations to be held by paying to the

Government an annual amount of money in lieu of doing actual development work. I believe that the paragraph as it is worded cannot possibly be carried, and, if carried, it will tend to curtail actual development work in new districts. As to increasing the annual assessment required by the Government from $100 to $150, for 20 acres, the prospectors have become so accustomed to the $100 worth of work required annually that I fear strong objections will be raised to any suggested increase.

The Chairman.—It ought to be pointed out that the 40-acre claim is not expected to be much more valuable than the present 20-acre claim, in point of rights. The 40-acre claim, without extra-lateral rights, is supposed to cover some of the dip, while the present 20-acre claim covers the dip as far as it goes.

Mr. Raymond.—It isn't really a hardship on the prospector, because he spends three days getting his tools to his claim and two days getting them back, and $100 worth of work doesn't amount to a pin.

Mr. Jennings.—In the Transvaal you can hold a claim 600 by 400 ft., which is nearly six acres, for three shillings and sixpence a month.

The Chairman.—In a great many instances, claims are located to hold land, but the formal object is to locate a mineral deposit, and the present claim of 20 acres may hold a good deal more in theory, through the operation of the extra-lateral right, than this proposed 40-acre claim would hold.

(Professor Raymond's amendment and Section IV as amended were now put to vote, and carried.

The Secretary.—

V. Subject to the existing extra-lateral rights of mining claimants or patentees, the holder or patentee of a mining claim located hereafter to have the exclusive right of possession and enjoyment of the surface held by him and of the minerals under it, bounded by vertical planes passing through surface boundaries of said land, but not the right to follow any mineral deposit beyond said planes. And the holders or patentees of claims heretofore located to have similar exclusive possession of all the mineral in claims not covered by any existing extra-lateral rights.

Mr. Finlay.—That embodies the essential feature that we have been looking for in the revision of the mining law.

Mr. Jennings.—I would like to know what the last phrase means: "And the holders or patentees of claims heretofore located to have similar exclusive possession of all the mineral in claims not covered by any existing extra-lateral rights."

Mr. Smith.—There are two classes of people on the ground, those who have patents and those who simply hold claims. Now, the man with a patent gets the extra-lateral rights if his land is patented before the passage of this act. Doesn't this mean that a man who is simply holding a claim which he has not put through to patent—a claim which has not, before the passage of this act, gone forward to patent—would come into the same class as the locators and patentees under this act.

Dr. Sussman.—A locator, under the present law, has a vested right, which can not be taken away.

Professor Munroe.—I think I see the object of this last sentence. It gives additional mineral rights to the holders or patentees of claims acquired under existing laws. It gives to such owners the mineral within vertical planes passed through the boundaries of their claims, in addition to the mineral which they hold under the apex law. That is, they get the mineral in the vertical parallelopipedon in addition to that in the inclined parallelopipedon. The additional right, however, is subject to existing rights arising from the extra-lateral privileges of adjoining claims. The sentence is necessary because when once the extra-lateral feature of the present law is repealed the unclaimed mineral vertically below existing claims would otherwise belong to nobody, and could not be secured by anybody.

Mr. Peele.—If Professor Munroe's explanation is correct, then certainly the last sentence should be re-framed, because what it defines is not apparent.

Mr. Jennings.—Under the present law, suppose one sinks a shaft and finds a vein. That is presumptively his, unless another locates alongside of him and proves he has the apex, and claims the vein. If this law is passed, nobody could do that, and the first claimant therefore acquires it as a matter of fact, by default.

Mr. Ingalls.—That last sentence means that a person who already has a claim located and patented—is already holding a claim under the existing law—and comes across an unknown vein which outcrops in some unlocated land, is entitled not only to the extra-lateral rights on the vein on which his location was made, which cannot be taken away from him, but also to that which is comprised within the vertical projection of his side lines.

Mr. Jennings.—That would be perfectly clear if the word "said" were inserted so as to read: "And the holders or patentees of claims heretofore located to have similar exclusive possession

of all minerals in said claims not covered by existing extra-lateral rights."

(Section V, as amended by Mr. Jennings, was then put to vote, and carried.)

The Secretary.—

VI. Notice of location of all mining claims made after the date of the passage of this Act must be filed for record with the register and receiver of the land district within which the lands are situated within one year from the date of each location, and unless final entry and payment be made for such claims within seven years after date of location, exclusive of the time covered by pending adverse claims, all rights thereunder shall cease.

Mr. Smith.—This stipulates that notice of location shall be "filed with the register and receiver of the land district." Under the present law, as I understand it, there is no record with the Federal Government.

Mr. Jennings.—A location, as I understand it, is now made with the State, not with the Federal authorities; it is here proposed to make it with the Federal authorities.

Mr. Ingalls.—As stated in the preamble to this memorandum, it is not intended to give legal phraseology. Now, this sixth section is taken from Senator Smoot's bill, which is now before the Senate, and is in legal phraseology. The idea is the same as in Section III, but the language of Section VI is legal.

Mr. Finlay.—The meaning of these words is not clear to me: "Within seven years after date of location, exclusive of the time covered by pending adverse claims, all rights thereunder shall cease." Does that mean that if a location is not completed and final title passed in seven years, then it must be re-located? That is, a man cannot, by re-locating year after year, perpetuate his title; or does it mean precisely that, that he must re-locate or stand a chance of somebody else jumping him?

The Chairman.—In Congressman Foster's bill it was made a misdemeanor for a person to re-locate a claim, and I think the locator of a claim that had been previously located and abandoned had to make a declaration he was not re-locating it for the account of the previous locator.

Mr. Finlay.—Unless there is some provision against re-locating so many times, these words have no meaning, because the practice now is, and always had been when I was out West, to re-locate a claim on January 1, every year, and there was no limit to the number of times it might be re-located. Does not this mean if a locator does not get a patent in seven years he can't get it at all.

Mr. Jennings.—It means that unless he gets his patent in seven years he never can get a patent on that particular ground, and must quit it.

(Section VI was now put to vote, and carried.)

Mr. Jennings.—What is the procedure, Mr. Ingalls; what is going to be done with this memorandum, now that the New York section has passed it?

Mr. Ingalls.—After passage by the New York section it goes to the Council. I imagine that the Council will first refer it to the Mining Law Committee and then act on the report of that committee. However, the final action of the Council must come before the Society.

Mr. Ingalls.—Before putting the question on these resolutions as a whole, I should like to ask what is the idea of the meeting, in view of the proposed 40-acre claims; suppose that somebody wants to locate a tunnel site, or a mill site; what is he going to do?

Mr. Jennings.—Locate a 40-acre claim; why not? Of course, the contour of the ground might be so difficult that he would have to locate four 40-acre tracts in order to get the ground that he actually desired for a mill site. As for tunnel sites, I don't see why he should not locate as many 40-acre tracts as he wants. He certainly is going to do enough work on a tunnel to pay for it. You can't drive a tunnel for less than $10 a foot. That is $13,200 to spend on one claim; or if he only goes through a bit of the claim he would certainly do enough work to obtain the patent.

Mr. Peele.—In drawing up this outline, was it the intention to include something equivalent to the present provision regarding tunnel sites?

Mr. Ingalls.—The idea was that if a man wanted to drive a tunnel to reach a group of claims, all he would have to do would be to locate a string of 10-acre claims contiguous with the group that he wanted to develop. With the unit as small as 10 acres, there would be nothing onerous about that, and such a provision would automatically take care of the whole problem and it would be unnecessary to make special provision for tunnel sites. With 40-acre claims he could do the same thing, but would take up a good deal more of the ground and would have to pay more money.

Dr. Sussman.—One matter that has been overlooked, or is covered in the common law, is the question of rights-of-way. That is related to this tunnel problem. In giving a man an exclu-

sive right to the surface and to the ground, you make no provision for crossing his claim. There should also be provision for rights-of-way for tramways.

Mr. Raymond.—That is covered by the present law; this one is simply defining the claim. Right-of-way is something we are not altering.

Dr. Sussman.—The right-of-way is not universal. It is under local regulations in some states and not in others.

Mr. Ingalls.—If you had a group of claims here and somebody held a claim there, and you wanted to start a tunnel beyond it to get this group, you could not, by any provision in Federal law of this country, obtain the right to go through that claim. Some State laws would permit it. In a new Federal law there might be a provision whereby the Government granting claims reserved a right of way for other persons. There might well be such a reservation.

Mr. Smith.—There is such a reservation in the Alaska coal law. Of course, in that case it is a leasehold, but the same regulation might apply in the case of a freehold.

Mr. Parker.—I had a case in Cripple Creek where a vein split and a portion of it went into an adjoininig vein; the owners of that vein would not permit us to run a crosscut from one vein to the other, because we were under their vertical boundaries. It was a holdup game, admittedly, but we were prohibited from passing from one vein to the other. That is Colorado law.

The meeting adjourned at 10:45 p. m.

Meeting of May 18, 1916.

The New York section held its regular dinner at the Engineers' Club, New York City, on May 18. The following members and guests were present: Lawrence Addicks, S. H. Ball, Percy E. Barbour, D. H. Browne, A. H. Cook, E. F. Eurich, H. W. Hardinge, Mr. Hague, S. J. Jennings, D. M. Liddell, Waldemar Lindgren, J. McDougall, G. H. Morgan, H. M. Payne, Robert Peele, A. H. Rogers, E. M. Rogers, M. B. Spaulding, E. G. Spilsbury, G. D. van Arsdale, F. V. van Gelder, W. H. Weed and Mr. Weiberg. At the meeting, at which A. H. Rogers presided, Dr. H. M. Payne gave an illustrated lecture on mining frozen gravel in Alaska, the Yukon and Siberia, showing a new method of thawing by hot water, instead of by steam. This lecture will be published in full in a later bulletin. At the close of the lecture D. H. Browne moved a vote of thanks to Dr. Payne.

D. M. LIDDELL,
Secretary of Section.

MEMBERS ELECTED IN MAY

Clark, Will L. .....Jerome, Ariz.
Manager, United Verde Copper Mining Co.
Keller, Edward .....Perth Amboy, N. J.
Metallurgical Chemist.
Goodloe, Meade .....406 South Main St., Los Angeles, Calif.
Consulting Engineer.
Rubidge, Frederick T. .....41 Broad St., New York
Mine and R. R. Mgr., Ladenburg, Thalmann & Co.
Shaler, Millard K. .....4 Bishopgate, London, E. C., England.
Chief Engineer. Ste. Internationale Forestere et Miniere du Congo.
Lachmund, Oscar .....Greenwood, B. C.
General Manager, British Columbia Copper Co., Ltd.

CHANGES OF ADDRESS

Bilharz, Oscar M. .....Baxter Springs, Kas.
Garrey, George H. .....501 Bullitt Bldg., Philadelphia, Penn.
Kirby, E. B. .....918 Security Bldg., St. Louis, Mo.
Prichard, W. A. ....Apartado 104, Barranquilla, Colombia, S. A.

PERSONALS

H. A. Guess has been appointed Managing Director of the Mining Department of the American Smelting & Refining Co.

J. A. Burgess has resigned from the superintendency of the Wonder Nevada Mining Co., to accept the position of General Superintendent of the United Eastern Mining Co., Oatman, Ariz.

Hennen Jennings is to sail from Seattle for Alaska on June 20, to look over the physical condition of the Treadwell mines.

R. W. Brock is Major in the 72nd Battalion, Seaforth Highlanders, of Canada.

J. R. Finlay, President of the Society, has accepted an invitation to deliver the commencement address at the Colorado School of Mines, Golden, Colo., on May 26.

W. R. Ingalls has accepted an invitation to deliver the commencement address at the School of Mining and Metallurgy, Rolla, Mo., on May 26.

F. F. Sharpless, former Secretary of the Society, spent the month of May in North Carolina examining saprolite deposits.

N. H. Darton, of the U. S. Geological Survey, has returned from Cuba, where he made a detailed investigation of artesian water prospects on one of the large sugar plantations.

STANDING COMMITTEES

Executive Committee

J. R. Finlay
L. D. Huntoon
A. S. Dwight
Geo. C. Stone
W. Lindgren

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James F. Kemp
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Professional Training

A. L. Walker, *Chairman*
F. W. Bradley
Sidney J. Jennings

Mine Taxation

J. R. Finlay, *Chairman*
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H. C. Hoover

Standardization

C. R. Corning, *Chairman*
J. Parke Channing
Geo. C. Stone

Welfare of Mine and Metallurgical Employees

J. Parke Channing, *Chairman*
R. M. Catlin
W. Y. Westervelt

Mining Law

H. V. Winchell, *Chairman*
J. W. Finch
F. W. Smith
C. W. Goodale
M. L. Requa
S. W. Mudd
Albert Burch

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Mining and Metallurgical Society *of* America

Bulletin Number Ninety-seven
June 30, 1916
Vol. IX, No. 6

Published at the Office of the Secretary
115 Broadway, New York

OFFICERS FOR 1916.

President, J. R. FINLAY, 52 William St., New York.

Vice-President, WALDEMAR LINDGREN, Mass. Institute of Technology, Boston, Mass.

Secretary, Treasurer, LOUIS D. HUNTOON, 115 Broadway, New York.

Executive Committee: Messrs. J. R. Finlay, L. D. Huntoon, A. S. Dwight, W. Lindgren, G. C. Stone.

COUNCIL.

At large, ex-officio.

J. R. Finlay, New York.....Retires January, 1917
Waldemar Lindgren, Boston.....Retires January, 1917
L. D. Huntoon, New York.....Retires January, 1917

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Hennen Jennings, Washington.....Retires January, 1917
R. A. F. Penrose, Philadelphia.....Retires January, 1919

District 7—Illinois, Iowa, Michigan, Minnesota, Missouri, Oklahoma, South Dakota and Wisconsin.

P. N. Moore, St. Louis.....Retires January, 1917

District 8—Colorado and Utah.

Philip Argall, Denver.....Retires January, 1918

District 9-10—Alaska, Oregon, Northern California.

M. L. Requa, San Francisco.....Retires January, 1918
C. W. Merrill, San Francisco.....Retires January, 1917

District 11—Southern California, Arizona, New Mexico and Texas.

S. W. Mudd, Los Angeles.....Retires January, 1919

District 12—Montana, Idaho, Washington, Nevada and British Columbia.

C. W. Goodale.....Retires January, 1919

OFFICERS OF SECTIONS.

SAN FRANCISCO.	NEW YORK.	PHILADELPHIA.
M. L. Requa, *Chairman.*	J. E. Johnson, Jr., *Chairman.*	F. L. Garrison, *Chairman.*
W. H. Shockley, *Secretary.*	A. H. Rogers, *Vice-Chairman.*	
	D. M. Liddell, *Secretary.*	

Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. June 30, 1916 No. 6

ANNOUNCEMENTS.

Bound Volumes.—In reply to the request for certain bulletins issued in 1915 to complete sets for binding, the Secretary has received a very generous response and desires to express his appreciation. Bound Volumes for 1915 have now been sent to all members requesting same, and in case of non-delivery, the Secretary should be notified promptly.

We have a surplus of seven bound copies, and any member desiring a 1915 bound volume can secure same on the payment of $1.50 until the surplus has been distributed.

New York Office.—The following letter, under date of May 22, was mailed to all members of the Society:

The Society has long felt the need of a permanent office. Heretofore it has been dependent upon the facilities furnished by its officers. A plan has been suggested (which has the approval of the Council) whereby the need of the Society may be met and whereby at the same time a new and useful service may be rendered to its members.

This plan contemplates the running of an office for the Society which may also be used by its individual members, especially out-of-town members, who have no office in New York. It is conceived that there are many such who come to New York occasionally and would like to have while here a place of business where the services of a reliable stenographer would be available, where appointments might be made, and where mail would be cared for and incidental services rendered. It is conceived, moreover, that the composition of the membership of the Mining and Metallurgical Society precludes the danger of objectionable developments that might arise under such a plan with a more heterogeneous membership.

As above stated, this plan has met with the approval of the Council, but before entering upon it, the judgment of the Council is that there should be an expression from the membership to indicate whether the plan can be safely financed. The idea is that the membership as a whole should not be taxed with any part of this plan beyond what has already been authorized for conducting the Society's business. The extra expense of such an undertaking should be borne by those members who desire to benefit directly from it. This might take the form of the following:

1. A member may acquire the right to a New York address, the

printing of same on his letterheads, the forwarding of his mail addressed to the New York office, and the casual use of the office for $25 per annum. By casual use of the office is meant such as might be granted by anybody to a favored caller.

2. The above, together with entry of his name in the New York telephone directory and on the directory in the office building, for $35 per year.

3. The above, together with the exclusive use of a desk, two desks in one office, for $240 per year.

4. Exclusive use of desk and office, together with proposition No. 2, $420 per year.

5. Use of desk for short periods of time, together with proposition No. 2, for an annual charge of $150, plus $5 per week, or portion thereof, when using same. (Ten weeks would cost $200.)

6. Outgoing telephone calls will be charged for at the rate of 5c. per call.

7. Stenographic service will be furnished at the rate of $1 per hour, $5 per day, or $100 per month.

Several members of the Society who live away from New York, but come here frequently, have expressed interest in this plan and a desire to co-operate.

The plan as outlined is offered more by way of a suggestion than as anything that has yet been definitely formulated. We desire to obtain a general expression of opinion on the subject, and members are earnestly requested to communicate with the Secretary.

LOUIS D. HUNTOON,
Secretary.

The Secretary has received about 50 replies. The plan has been heartily endorsed in most of the replies, but only one member desires to avail himself of the privileges offered. The letters as a whole indicate that the members have their New York affiliations and have no need for such privileges. One or two members are strongly averse to the plan, considering it a business undertaking, whereas it was not the intention of the Society to increase its revenue, but to merely meet expenses for such services as the Society might render. One member calls attention to the fact that it might be a very dangerous undertaking and that it must be understood beyond possibility of mistake that the name of the Society must not be brought into private business and, above all, into opinions on the value of mining or other property. If a member have an office in the Society's quarters, the street address alone should be used.

COMMUNICATIONS.

MINING LAW REVISION.

F. F. Sharpless, June 23.—In reference to the matter of alterations in the Land Laws of the United States as they affect mineral locations, which subject is now under consideration by

the Mining and Metallurgical Society, I have read with much interest the reports of the meeting held on April 19, and the recommendations that were referred to the Committee on Mining Law.

The discussion as reported was most interesting, and it is to be regretted that it was participated in by such a small percentage of our membership.

I am not informed as to what action other sections have taken in respect to this latest phase of a most important subject, but the lack of any communications in the May bulletin suggest that the recommendations have not been studied by a number of our members who have very definite views upon several of the points discussed.

If it has not already been done, and if the Committee on Mining Law would care for it, would it not be advisable to write personally to all of our members asking them to communicate fully their views, whether approving or disapproving, in order that the Committee may be fully advised of the attitude of the membership before it makes it report to the Council?

L. D. Huntoon.—The suggestion as outlined in the above letter has been followed out by the Secretary, and a letter has been mailed to the entire membership.

Alaska Mining and Engineering Society, June 9.—At the request of Mr. Philip R. Bradley, the above Society of Juneau, Alaska, organized in the fall of 1914, has forwarded to the Secretary the following resolutions adopted by that Society at a recent meeting:

"WHEREAS a serious endeavor has been made to correct defects in the 50-year-old mineral land laws of the United States and Alaska, in order that they will be in harmony with the various changes resulting from the general advancement in the mineral industry and can, therefore, adequately meet present-day requirements; and

WHEREAS various professional and scientific organizations, such as the American Institute of Mining Engineers, the American Mining Congress, the Mining and Metallurgical Society of America, the Idaho State Mining Association, the Montana Society of Engineers, the California Metal Producers' Association, the Spokane Mining Men's Club, the Nevada Mine Operators' Association, the Colorado Scientific Society, together with representatives from several chambers of commerce and from operating mines have harmoniously united in an effort to secure the passage of a bill by Congress 'to provide a commission to codify and suggest amendments to the general mining laws'; and

WHEREAS there appeared before the Committee on Mines and Mining of the House of Representatives, engineers from the above organizations, acting as authorized delegates, and who command the respect and confidence of their respective societies, and whose motives, honesty and sincerity of purpose are not to be questioned, and

WHEREAS, the Hon. James Wickersham, Delegate from Alaska, who also appeared before the House Committee on Mines and Mining, chose to attack the personalities of these engineers, as well as their honesty and motives, and through his abuse and ribaldry brought the people of Alaska into ridicule and contempt; now, therefore, be it

RESOLVED, That the Alaska Mining and Engineering Society, assembled at Juneau, go on record as expressing its earnest disapproval of the tactics adopted by the Hon. James Wickersham, and to express also a feeling of humiliation at being represented at Congress by one whose chief method of argument against the bill was personal abuse.

RESOLVED, That we, as engineers of Alaska, are convinced that the efforts of the engineers appearing before the House were honest and sincere, and that the passage of the bill would have resulted in good, not only for the entire country, but for Alaska in particular.

RESOLVED, That it is the sense of the Alaska Mining and Engineering Society, that the House Committee made a grave mistake in failing to act favorably upon the bill, as to the best of our judgment, a commission organized as provided by the bill will be the most efficient and prompt means of revising the mining laws beneficially.

RESOLVED, That due publicity be given to these resolutions and that they be sent forthwith to the various societies, engineering papers and public officials chiefly concerned."

CHANGES OF ADDRESS.

Laird, George A.....North Yakima, Washington
Williams, Ralph B.....Room 2202, 120 Broadway, New York

MEMBERS ELECTED IN JUNE.

Gepp, Herbert W.....120 Broadway, New York
General Manager, Amalgamated Zinc (DeBavay's), Limited.
Hanley, H. R.....Winthrop, Calif.
Works Mgr., Development Electrolytic Process for Zinc Ores and Products.
Kirchen, John G.....Tonopah, Nevada
General Manager, Tonopah Extension Mining Co.

OBITUARY.

William Nelson Merriam, geologist for the United States Steel Corporation, died at Duluth, Minn., after an illness of some months. He was born in 1860 at Waupun, Wis., and was a graduate of the University of Wisconsin. He was a member of the American Historical Society, Mining and Metallurgical Society of America, American Iron and Steel Institute and of many other clubs and societies.

PERSONALS.

Prof. William Bullock Clark, head of the department of geology at Johns Hopkins University, and State geologist of Maryland, has been appointed by the Chamber of Commerce of the United States a member of a committee of five to discuss with the representatives of organized labor a modification of the anti-trust laws by which co-operative agreements under the regulation of the Federal Trade Commission might be allowed in those industries dealing with the primary natural resources.

Corey C. Brayton and E. R. Richards have opened offices in the Hobart Building, San Francisco, for the practice of mining and metallurgical engineering.

Louis D. Huntoon, Secretary of the Society, is at present in Arkansas examining certain zinc properties.

F. Lynwood Garrison left for Brazil recently, where he expects to remain for three or four months.

James S. Douglas is on a business trip in the East.

J. R. Finlay, President of the Society, has just returned from a trip to Colorado, Utah and Missouri. At Golden, Colo., May 26, he delivered the commencement address at the Colorado School of Mines.

Percy E. Barbour has resigned his commission as 2nd Lieutenant in the Main Coast Artillery, in order to accept a commission as 1st Lieutenant in the 22nd Corps of Engineers, N. G. N. Y., and is now at Camp Whitman, preparatory to going to the border with his battalion.

Louis S. Cates, General Manager of the Ray Consolidated, visited New York recently.

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A. S. Dwight
Geo. C. Stone
W. Lindgren

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C. R. Corning, *Chairman*
J. Parke Channing
Geo. C. Stone

Welfare of Mine and Metallurgical Employees

J. Parke Channing, *Chairman*
R. M. Catlin
W. Y. Westervelt

Mining Law

H. V. Winchell, *Chairman*
J. W. Finch
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Mining and Metallurgical Society *of* America

Bulletin Number Ninety-eight
July 31, 1916
Vol. IX, No. 7

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OFFICERS FOR 1916.

President, J. R. FINLAY, 52 William St., New York.

Vice-President, WALDEMAR LINDGREN, Mass. Institute of Technology, Boston, Mass.

Secretary, Treasurer, LOUIS D. HUNTOON, 115 Broadway, New York.

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R. A. F. Penrose, Philadelphia.....Retires January, 1919

District 7—Illinois, Iowa, Michigan, Minnesota, Missouri, Oklahoma, South Dakota and Wisconsin.

P. N. Moore, St. Louis.....Retires January, 1917

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M. L. Requa, San Francisco.....Retires January, 1918
C. W. Merrill, San Francisco.....Retires January, 1917

District 11—Southern California, Arizona, New Mexico and Texas.

S. W. Mudd, Los Angeles.....Retires January, 1919

District 12—Montana, Idaho, Washington, Nevada and British Columbia.

C. W. Goodale.....Retires January, 1919

OFFICERS OF SECTIONS.

SAN FRANCISCO.	NEW YORK.	PHILADELPHIA.
M. L. Requa, *Chairman.*	J. E. Johnson, Jr., *Chairman.*	F. L. Garrison, *Chairman*
W. H. Shockley, *Secretary.*	A. H. Rogers, *Vice-Chairman.*	
	D. M. Liddell, *Secretary.*	

Editor, Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. July 31, 1916 No. 7

ANNOUNCEMENTS.

Council.—A meeting of the Council was held at the Whitehall Club, New York, on Thursday, July 27, at 12:30 p. m. The minutes of this meeting will be published, in detail, in the next bulletin.

COMMUNICATIONS.

MINING LAW.

The Secretary.—On July 10, 1916, the following letter was sent to all members:

Dear Sir:

The most important work before the Society at the present time is that of securing certain alterations in the Federal Land Laws as they affect mineral locations.

The attempt made at various times to secure a congressional commission to investigate the subject and to make recommendations to Congress, culminating in the strongest possible presentation to Congress last winter by a combination of American organizations interested in mining, failed to secure the desired result.

It is now the belief of our representatives in Washington that the changes can only be secured by presenting to Congress a bill which shall embody the changes desired.

Acting upon this belief, a set of specific recommendations was introduced and discussed at the meeting of the New York Section on April 19. The recommendations and the discussion were published in Bulletin No. 96.

Copies of the recommendations have been sent to all organizations which have shown any interest in the subject, and they are now receiving consideration by these organizations.

It will be of the greatest assistance to the Committee on Mining Law if every member will study the recommendations and submit his approval or disapproval and any comments he may wish to make upon each paragraph of the suggestions that have been made.

While this is submitted in the form of a circular letter, the Committee begs that it be considered as a personal appeal to every member to do what he can to assist in its onerous task and urges that the matter be given serious thought at an early date.

Communications should be addressed to Mr. H. V. Winchell, Chairman of the Mining Law Committee, 505 Palace Bldg., Minneapolis, Minn., or to the Secretary of the Society, 115 Broadway, New York.

Very truly yours,

L. D. Huntoon,

Secretary.

To the above letter, the following replies have been received:

George E. Collins.—Speaking generally, I think the New York section has considered the proposed legislation from the standpoint of the large-scale mine operator. The difficulties of the prospector and small operator (with whom, even to-day, the majority of mines originate) should receive at least equal consideration. We must bear in mind that the essential object of the United States, in practically giving away its mineral lands, is to get them more quickly developed.

Prerequisite of Discovery.—I, therefore, think that the entire abolition of the discovery requirement (while it admittedly offers some advantages on the score of convenience and simplicity in the location of millsites, etc.) is inadmissible. The necessary opportunity for prospecting deep-seated mineral-bearing strata, etc., can be obtained by a provision adopting the doctrine now held by the California Supreme Court, giving bona fide locators the right of possession whilst work is prosecuted with reasonable diligence, pending discovery, patent not to issue until discovery is made.

Size and Shape of Claims.—I see no particular advantage in making claims conform to existing divisions of the public survey. In some sections, these are anything but rectangular now, due to faulty surveying. A more serious objection is that the proposal might necessitate a prospector's taking up, and paying for, a uselessly large area; as in the case of a vein running through one corner of a 40-acre division, and dipping away from it, when it would be necessary to take up a quarter-section in order to get a workable claim.

It is well that claims should be square, with boundaries running north and south, east and west; but I see no particular advantage in making them conform to section divisions.

Assessment Work.—The proposal to pay $300 to the Government, in lieu of performance of assessment work worth $200, will be very unpopular in the Western mining camps, and I do not think the advantages offset this objection.

The suggestion that excess development performed in one year be applicable to the assessment for succeeding years, I regard as highly objectionable; and I do not think it will have any chance of being accepted in the West.

A very serious omission from the proposals of the New York section is the absence of any provision for the enduring of honest performance of assessment work, or of recording it. In my view, this is one of the most serious failures of the existing law, and one which may be easily remedied.

Extralateral Rights.—Personally, I regard with considerable misgiving the complications which may arise if square claims, not based on discovery, and carrying no extralateral rights, are introduced into some of our older districts, which are already criss-crossed with an intricate network of apex-right claims; I would prefer to see this provision confined to new districts. In the older districts, little benefit can be hoped for from it, in any event, and the possibilities of creating new sources of litigation are serious.

If it is impossible to draw any distinction in this respect then the owners of existing rights, and particularly of operating mines, should be given a preferential right to locate new square claims, covering fractions of open ground in their vicinity. Failing this, we shall be creating endless opportunity for blackmail.

Time Limit for Patenting.—The requirement that all claims located be patented within seven years may, in some cases, prove burdensome to bona fide prospectors. In any case, it will be highly unpopular, and, to my mind, offers no sufficient counterbalancing advantage.

As chairman of committees appointed by the Colorado Scientific Society and the Colorado Metal Miners' Association to consider the subject of changes in the mining law, I would like to add that the committees in question have not pronounced upon the proposals advanced by the New York section of the Mining and Metallurgical Society; and that the foregoing criticisms express only my individual views.

F. F. Sharpless.—Replying to the request of the Secretary of the Society to communicate our views in respect to the suggestions that were made and discussed at the New York meeting, April 19, I beg to communicate the following:

Paragraph I received a most thorough discussion, and the meeting was extremely fortunate in having Dr. George Otis Smith in attendance, who spoke freely and frankly upon the practical working of existing laws and regulations and gave the interpretation that the Department of the Interior would probably place upon the proposed modifications.

As the result of the discussion, Mr. Parker's amendment to the last line of paragraph I "Not to be open to the location of mineral claims until proved to contain mineral," was carried in spite of the fact noted by Prof. Peele that it conflicts in spirit with the third line of paragraph III.

One of the most needed changes is that of being able to make a valid location without discovery. I think we all admit this; and if true in respect to lands that have been classified as mineral, it is equally true with lands that have not yet been classified or have been inaccurately classified as non-mineral.

If a tract is unclassified, and yet I feel warranted in spending my money to discover something buried far beneath the surface, surely that fact should not prevent me from making a mineral location in order to protect myself while doing my development work. Hence, I should be inclined to omit the amendment, leaving paragraph I as it came to the New York section, and later, paragraph III, so that location without discovery might be made on unclassified lands as well as upon those that have been classified as mineral.

Mr. Jennings argued strongly for an immediate classification and one that would not be changed, while Dr. Smith pointed out the physical difficulty in the way of such a course.

After studying the remarks of both sides, it appears to me that here again the suggestions as they came to the New York section can be but little improved. If one has reason to believe that commercial ore exists within a certain area which has been called non-mineral, paragraph I prevents him from making a mineral location, but it does not prevent him from making an agricultural location, the only manner that is offered for taking it up.

If he takes up 320 acres of such land, and proves that it contains workable deposits, my understanding from Dr. Smith's remarks is that the Department will confirm his title without question of fraud, but may change the classification of the surrounding acres.

Size and Shape of Claims.—I favor 10- or 40-acre claims, with boundaries conforming to existing section lines in surveyed districts, or with N-S, E-W boundaries in unsurveyed districts, the amount of assessment work, or payment to the Government in lieu thereof, to be the same per acre as at the present time.

Hon. Carl Hayden.—(April 17, 1916.)—I enclose herewith a copy of my bill authorizing mining for metalliferous minerals on Indian reservations. Since reporting this bill, some doubts have been raised in my mind as to the effect of the amendment increasing the rate of royalty from 2 per cent. to 5 per cent. of the gross value of the output of the minerals at the mine. I have received letters from two prominent mining men, one of whom suggested that it would be fairer to base the royalty on the gross value of the metals recovered. The other suggestion was that the royalty should be paid on the net mill or smelter returns upon all milling ores, and a larger royalty upon the like returns on smelting ores. I shall be greatly obliged if you will give me the benefit of your views on this question.

I expect to call this bill up for consideration in the near

future and will appreciate a letter from you at your earliest convenience.

Section 8, H. R. 12,426, to which Col. Hayden refers, reads as follows:

> That for the privilege of mining or extracting the mineral deposits in the ground covered by the lease, the lessees shall pay to the United States, for the benefit of the Indians, a royalty which shall be five per centum of the gross value of the output of the minerals at the mine, due and payable at the end of each month succeeding that of the extraction of the minerals from the mine, and an annual rental, payable at the date of such lease and annually thereafter on the area covered by such lease, at the rate of 25 cents per acre for the first calendar year thereafter; 50 cents per acre for the second, third, fourth, and fifth years, respectively; and $1 per acre for each and every year thereafter during the continuance of the lease, except that such rental for any year shall be credited against the royalties as they accrue for that year."

Members are requested to answer Hon. Carl Hayden's letter, addressing the same through the office of the Secretary.

MEMBERS ELECTED IN AUGUST.

Drew, Charles V.....15 Broad St., New York City
Engineer, Cerro de Pasco Mining Co. and Morococha Mining Co.

Keffer, Frederick .....610 Hutton Bldg., Spokane, Wash.
Consulting Mining Engineer.

Roger, John .....32 West 40th St., New York City
Mechanical and Metallurgical Engineer.

Taylor, Knox .....High Bridge, N. J.
President, Taylor-Wharton Iron & Steel Co.

CHANGES OF ADDRESS.

Pumpelly, Raphael .....Dublin, N. H.
Wright, Louis A. .....Casolla 125-D, Santiago, Chile

PERSONALS.

Ralph Arnold, consulting geologist and petroleum engineer, has removed his New York office to the Equitable Building, 120 Broadway.

J. M. Boutwell is in Peru preparing a geological report on the Cerro de Pasco mines.

Louis D. Huntoon has left for Keystone, S. D., to examine the Bullion, Holy Terror, and Keystone mines.

Seeley W. Mudd, who has been spending a few weeks in New York, has returned to Los Angeles.

J. B. Tyrrell, of Toronto, Canada, is spending some time in British Columbia. His address while there will be the Vancouver Hotel, Vancouver, B. C.

STANDING COMMITTEES

Executive Committee

J. R. Finlay
L. D. Huntoon
A. S. Dwight
Geo. C. Stone
W. Lindgren

Annual Medal

H. S. Munroe, *Chairman*
James F. Kemp
Arthur L. Walker

Professional Training

A. L. Walker, *Chairman*
F. W. Bradley
Sidney J. Jennings

Mine Taxation

J. R. Finlay, *Chairman*
E. T. Conner
H. C. Hoover

Standardization

C. R. Corning, *Chairman*
J. Parke Channing
Geo. C. Stone

Welfare of Mine and Metallurgical Employees

J. Parke Channing, *Chairman*
R. M. Catlin
W. Y. Westervelt

Mining Law

H. V. Winchell, *Chairman*
J. W. Finch
F. W. Smith
C. W. Goodale
M. L. Requa
S. W. Mudd
Albert Burch

Delegates to Cooperative Committee on Mining Law

H. V. Winchell
J. Parke Channing
R. A. Parker
S. W. Mudd
M. L. Requa

PAST PRESIDENTS

Henry S. Munroe.....1908-1909
Henry M. Chance.....1913
J. Parke Channing....1910-1912
James F. Kemp.....1914
W. R. Ingalls.....1915

FORMER SECRETARIES

J. R. Finlay 1908-1909
W. R. Ingalls.....1911-1914
Henry S. Munroe 1910
F. F. Sharpless.....1915

ANNUAL MEDAL

1914 { Herbert C. Hoover / Lou Henry Hoover
1915 Robert H. Richards
1916 James F. Kemp

Mining and Metallurgical Society *of* America

Bulletin Number Ninety-nine
August 31, 1916
Vol. IX, No. 8

Published at the Office of the Secretary
115 Broadway, New York

OFFICERS FOR 1916.

President, J. R. FINLAY, 52 William St., New York.

Vice-President, WALDEMAR LINDGREN, Mass. Institute of Technology, Boston, Mass.

Secretary, Treasurer, } LOUIS D. HUNTOON, 115 Broadway, New York.

Executive Committee: } Messrs. J. R. Finlay, L. D. Huntoon, A. S. Dwight, W. Lindgren, G. C. Stone.

COUNCIL.

At large, ex-officio.

J. R. Finlay, New York.....Retires January, 1917
Waldemar Lindgren, Boston.....Retires January, 1917
L. D. Huntoon, New York.....Retires January, 1917

Districts 1-2-3-4—New York, New Jersey and New England.

J. Parke Channing, New York.....Retires January, 1917
A. S. Dwight, New York.....Retires January, 1918
George C. Stone, New York.....Retires January, 1918
W. R. Ingalls, New York.....Retires January, 1919

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	D. M. Liddell, *Secretary.*	

Editor. Edward K. Judd

Mining and Metallurgical Society *of* America

Vol. IX. August 31, 1916. No. 8

ANNOUNCEMENTS.

Revision of the Mining Law.—Members of the Society and the public generally should understand clearly that the Mining and Metallurgical Society of America has as yet committed itself in no wise with regard to revision of the mining law of the United States, except for the action taken by referendum on March 30, 1914, and actions taken at the Washington meeting on December 16, 1915. The recent memorandum adopted by the New York section of the Society was an action by that section alone and was not an action by the Society. The memorandum is now receiving the consideration of the Society's Committee on Mining Law. A report of that Committee will go to Council for approval or disapproval, and from the Council the matter will go before the membership.

New York Section.—The next meeting of the New York section will be its annual meeting for the election of officers and such other business as can properly be introduced. It will be held at the Engineers' Club, 32 West 40th St., at 8 p. m. on Thursday, Sept. 21. An informal dinner at 6.30 p. m. will precede the meeting. Please make a special effort to be present.

DONALD M. LIDDELL,
Section Secretary.

Distribution of Membership for 1917.—Article 7 of the by-laws of the Society provides that from time to time the territory occupied by the membership shall be subdivided into 12 geograpical districts, containing approximately the same number of members. The number of members per district for 1917 should be 22. Distributing the membership among the districts adopted for 1916, we should have:

1–2–3–4	New York (76), New England (15), New Jersey (7)	98
5–6	Pennsylvania (25), Ohio (2), Maryland (1), North Carolina (2), Virginia (2), West Virginia (2), District of Columbia (6)	40
7	Arkansas (1), Iowa (1), Michigan (6), Minnesota (2), Missouri (5), Oklahoma (1), South Dakota (2), Wisconsin (2)	20
8	Colorado (11), Utah (8)	19
9–10	Alaska (1), Northern California (39), Oregon (1)	41

11	Arizona (11), Southern California (10), Texas (3)	24
12	Idaho (3), Montana (4), Nevada (3), Washington (3), Canada (9)	22

It will be noted in the above that the transfer of New Jersey from district 1-2-3-4 to district 5-6 will give a more even distribution, and that district 5-6 will then have a sufficient number to be subdivided into two separate districts. The state of Washington should be included in the Pacific Coast district 9-10. A better subdivision would be to include Oklahoma and Texas in the same district with Colorado and Utah.

In the following re-subdivision, formally adopted by the Council, on July 27, 1916, the present councillors have been kept in mind, so that they will still represent the same district, number and state, if re-elected.

1–2–3–4	New England (15), New York (76)	91
5	Pennsylvania (25)	25
6	Ohio (2), West Virginia (2), Maryland (1), Virginia (2), North Carolina (2), District of Columbia (6), New Jersey (7)	22
7	Minnesota (2), Wisconsin (2), Michigan (6), Iowa (1), Missouri (5), South Dakota (2), Arkansas (1), Kansas (1)	20
8	Colorado (11), Utah (8), Oklahoma (1), Texas (3), Mexico (1)	24
9–10	Northern California (39), Oregon (1), Washington (3), Alaska (1)	44
11	Southern California (10), Arizona (11)	21
12	Nevada (3), Idaho (3), Montana (4), Canada (9)	19

American Mining Congress.—The following invitation has been received from the Secretary of the American Mining Congress:

Louis D. Huntoon, Secy.,
Mining & Metallurgical Society of America,
New York City.

My dear Sir:

I am instructed to send to you, and through you to the members of your Society, a cordial invitation to attend the Nineteenth Annual Session of The American Mining Congress to be held at the La Salle Hotel, Chicago, November 13-16, 1916, and to take part in its deliberations.

The morning sessions will be general meetings at which the attendance of all members of the Convention is hoped for, which sessions will be devoted to a discussion of subjects related to the three several heads "safety," "efficiency" and "conservation." The afternoon meetings will be divided into several sections, each devoted to the discussion of subjects of interest to its special branch of the industry.

It is planned to have all papers printed and distributed, giving the author a limited time in which to present the salient features of his address, but allotting the greater part of the time to a discussion of the subject by members on the floor. By this plan it is hoped to have a free

expression of opinion and to provide ample time for reaching conclusions to be embodied in resolutions representing the best thought of the mining industry.

We trust that your members will accept this invitation and that we may have the benefit of their active co-operation in working out the problems of the industry.

J. F. CALLBREATH,
Secretary.

COUNCIL.

Meeting of July 27, 1916.

A regular meeting of the Council was held at the Whitehall Club, July 27, 1916. Those present were: Messrs. Finlay (President), Dwight, Channing, Mudd, Ingalls and Huntoon.

Mining Law Revision.—Mr. Ingalls, reporting for the Mining Law Committee, stated that it hoped to report to the Council early in September.

New York Office.—It was moved, seconded, and unanimously carried that, inasmuch as replies from members indicate that they do not care to avail themselves of the New York office facilities suggested in a circular letter, May 22, the matter be indefinitely postponed.

Award of Medal.—After a careful discussion of specific objects for which the Society's medal should be awarded in 1917, it was moved, seconded, and unanimously carried that the specific object for which the medal shall be awarded be non-ferrous smelting. Six votes were cast and three letters were received from councillors suggesting the same object.

Membership Distribution.—The Secretary submitted the geographical distribution of the present membership among the districts as adopted in 1915, and offered a re-distribution as printed under Announcements, on a previous page. The re-distribution as suggested by the Secretary was adopted.

Standardization.—The advisability of supporting the introduction of the use of the metric system of weights and measures in the United States was discussed by the Council, and Mr. Channing made the following remarks:

"I doubt very much whether the metric system will ever be introduced in Anglo-Saxon countries. Nearly all of our machines, and the machines for making machines, are built upon the inch system. One may say with propriety that machines of precision were developed in England about the time of the invention of the steam engine. Various inch tools were sent to Europe and machinery was built up based upon this system. When France and Germany went over to the metric system they were so tied up to the inch system that it was impossible for them to

break away entirely from that standard. The machines for making bolts, nuts, and for cutting threads had all been fixed for many years and these were still retained. The result is that in France and Germany, while many dimensions are given in the metric system, if they are figured back it will be found that they are just the nearest approximation to the inch measurement. So that, although Germany and France nominally build their engines and machines on the metric system and follow even figures for the large dimensions, a great deal of the smaller work is really done on the inch system.

"To change from the inch system to the metric system would mean the scrapping of millions of dollars' worth of machinery, and for years to come two different types of machines would be necessary; those for the new system, and those for repair parts and replacement for the old. I cannot see that anything will be gained by such a change."

COMMUNICATIONS.

REVISION OF THE MINING LAW.

Montana Society of Engineers.

The following communications, forwarded by C. W. Goodale, member of this Society's Committee on Mining Law, represent part of a discussion on this subject at the May meeting of the Montana Society of Engineers. The discussion centered about the memorandum adopted by the New York section on April 19, 1916 (published in Bulletin 95, pp. 83-85; and Bulletin 96, pp. 106-126), but the speakers did not confine themselves to the recommendations of that memorandum. The Society is grateful for the privilege of publishing these valuable communications in its bulletin.

L. O. Evans.*—I have gone carefully over the synopsis of amendments to the mining laws proposed by the New York section of the Mining and Metallurgical Society. Generally, I agree with the amendments there set forth, but think there are others fully as necessary and important. Briefly, the changes that I should recommend are as follows:

1. The first and most important is to abolish all extralateral rights, and make provision for locations not over 1500 ft. square. The arguments for and against the extralateral-right provisions in our present law have been fully discussed, and there is no need to go into them in detail. But it seems to me that the first essential of any investment in mining property,

* Attorney at Law, Butte, Mont.

as in other property, is certainty of ownership; that is, the investor should know, or have means of ascertaining, at least approximately, what he is securing. It has certainly been illustrated in practically every mining camp in America that the extralateral-right doctrine affords anything but certainty; and the prospect of an operator's being at any time plunged into the vexatious, expensive and uncertain litigation that almost invariably follows an extralateral disputs is anything but encouraging.

2. Some provision should be made for affording a prospector protection in his possession of government land prior to his making an actual discovery of mineral. Under the location laws in force in Montana and many other states, an opportunity is given the locator to prospect his lode, ascertain its course and secure some definite information as to the ground to be located, before he makes his final record; but these laws do not cover the cases of blind lode or other situation where time is requisite to make an actual discovery. Provision should be made for permitting a prospector to take possession and to define the extent of ground included in that possession of a tract of government domain, not greater in extent than that which can be covered by the location when perfected, and giving the prospector a reasonable time, to be fixed, in which to make a discovery.

3. There should be a more thorough and comprehensive definition of mineral than is found in the present laws. In connection with this, the amendments should be so framed as to make the law cover what Congress evidently intended the present law to cover. In some instances, by decisions, particularly of the Land Office, the operation of the present mineral land act has, without doubt, been restricted in a way that was not intended by Congress; for instance, in connection with the location of land chiefly valuable for building stone, under the present law. Before the passage of the act of 1892, which provided that land containing building stone should be locatable under the mineral land acts, there was a variety of rulings in the land office, particularly upon deposits of ordinary building stone, as to whether stone land was mineral land within the meaning of the act. By the act of 1892, Congress plainly intended to provide that land whose chief value consisted of the building stone found within it, should be regarded as other mineral lands, and locatable under the mineral acts. In spite of this, the land office has again and again held that Congress meant stone of special value for ornamental work, or having some peculiar quality which distinguished it from the ordinary country rock. Under these decisions, title has been denied by the Government for

deposits of ordinary building stone, no matter how valuable they may be in the particular locality, or how necessary the obtaining of title to them may be in the development of that particular locality. I think the amendment should be so worded that no court or other tribunal could escape its meaning, and that the test of the right of location upon land containing building stone should be the same test as applied to other mineral lands—that is, whether they are more valuable for that purpose than for agricultural or other purposes.

4. A plain and clear statute of limitations should be adopted limiting the time in which patents from the Government may be attacked or rights set up under exceptions from the patent. To this suggestion it might be answered that we now have a six-year statute of limitations barring attacks upon patents. Where this statute has been invoked as against attacks upon patents for fraud, it has been held by some courts that the limitation does not begin to run until the actual discovery of the fraud. With such a construction of the act, it is plain that the security which should be afforded by the United States patent is not given; but even if this statute should be amended or finally construed to cover all cases of attacks upon patents, it still would not reach the situation I have in mind. For illustration, in all patents for placer land, all veins and lodes known to exist at the time of the application for patent are excepted by statute. Under that act, there is no limit of time within which a claimant to a lode may seek to establish his title as against the placer patent, and as a result the owner of ground under a placer patent can never be secure from such attacks. A period of limitation should be fixed, after which claims of right to a lode, because of an assertion that it was known to exist at the time of the application for placer patent, should be barred.

5. Provision should be made for determination in a court, either by appeal from the land office or by original proceeding in cases of contest by rival claimants or by the Government, as to the right of a holder of unpatented ground to patent. In cases of adverse claims, that is, conflicting claims to rights to patent to ground, provision is now made for the trial of such right of possession in the courts, but no provision is made for trying a protest by any one in the land office against the right of a claimant to patent, nor a protest or contest made by the Government, except the trial in the land office. Under the present practice, the decision of the land office is final. In the Government cases, particularly, agents of the Department of the Interior make the charges, furnish the evidence, attorneys regularly employed by the Department prosecute the contest, and

they are tried and finally determined by the officials of the Department; in other words, the land office is prosecutor, witness, and judge, and that such practice has most injurious results, I think, is beyond question. In the case of an ordinary prospector, the very bringing of the contest is ofttimes sufficient to deprive him of his ground, as in most instances he is not able to stand the expense necessary properly to present his case. The practice not only is productive of serious injustice to the particular claimant, but is most harmful through creating an impression in the community generally of unfairness and oppression in the governmental administration.

There are many other details in which our present code might be improved, which have suggested themselves to prospectors, mine operators, and attorneys who have had any considerable experience with the practical working of our present mining laws, federal and state, but the foregoing remarks suggest the main features which I think Congress should endeavor to correct without unnecessary delay.

John Gillie.*—The proposed changes in the mining laws should aim to correct a few of the particularly objectionable features of the present laws, and should not attempt to change many of the state laws and regulations, now so well understood by the average prospector and miner. I would suggest the following:

1. A discovery of valuable mineral should be the first requirement towards making a location; the point of discovery to be situated in any part of the claim.

2. Vertical planes through the boundaries to limit all mining rights.

3. Size of claim to be, for maximum, 1320 by 1320 ft., and as much less as the locator desires to appropriate. The boundaries need not conform to N.—S. or E.—W. lines, but may have any course, or bearing, desired.

4. A limitation not exceeding five years after a placer patent, within which a known lode may assert claim against a placer.

5. Annual assessment work to value of $100 per claim, as provided under present laws. If, in any calendar year in which assessment work is necessary, the owner of a mining claim shall have his claim surveyed and cause a plat or map with full description to be filed with the recorder of the county in which his claim is situated, such survey and filing shall be accepted instead of the required $100 assessment work for that year.

* Mining Engineer, Butte, Mont.

All other conditions to conform to present laws.

E. D. Gardner.*—Seemingly the greatest objection to our present statutes pertaining to metalliferous deposits is directed against the law of the apex. Those who are in favor of not changing this law are so far in the minority that they apparently realize that it is useless to urge its retention.

Next to the repeal of the law of the apex, there seems to be a widespread advocacy for the repeal of the law requiring discovery of mineral before a valid location of a mining claim can be made. To a lesser extent there appears to be a desire to have the law further changed in this respect, so as to allow patent for claims without mineral discoveries.

The purpose of my discussion is to review the arguments in favor of the proposed change of the discovery requirement, to show some of the evils which may be expected to result therefrom, and to consider whether a system may be devised which will correct the undesirable features of the present law in this respect, and at the same time not expose the mining fraternity and the general public to the evils which would result from the repeal of this fundamental requiremnt.

Under the law as at present framed, the validity of a mining location is dependent upon the fact of discovery of mineral within the boundaries of the land claimed.

* * * but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. (Sec. 2320, U. S. Rev. Stat.)

All authorities agree that discovery is the source of the miners' title. Lindley, in his valuable work on mines (3d Ed., Sec. 335) lays down the rule in part as follows:

> Discovery is the initial fact. Without that no right can be acquired. * * * Such discovery must precede the location, or be in advance of intervening rights. The proof of recording and marking a claim will not authorize the court to presume a discovery.

As is well stated by the U. S. Supreme Court in Erhard v. Boaro (113 U. S. 536):

> A mere posting of a notice on a ridge of rocks cropping out of the earth or on other ground, that the poster has located thereon a mining claim, without any discovery or knowledge on his part of the existence of metal there, or in its immediate vicinity, would be justly treated as a mere speculative proceeding, and would not of itself initiate any right There must be something beyond a mere guess on the part of the miner to authorize him to make a location which will exclude others from the ground, such as the discovery of the presence of the precious minerals in it, or in such proximity to it as to justify a reasonable belief in their existence.

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Accordingly, if the miner has made a discovery and otherwise conformed to the requirements of the law, his possession of the claim located is exclusive as against all the world, even, in all probability, against the owner of the land, the Government, except on areas which Congress by special legislation has set apart and defined for paramount purposes, such as National Parks. He has an interest in the land which descends to his heirs, which he can dispose of by will, by deed, or other contract, and all that is required of him after location, until patent is secured from the Government, is to keep his claim alive by performance of the annual assessment work thereon.

In cases where two private locators claim the same ground, the one first making a discovery of mineral would probably get the conflicting area, irrespective of the relative time of beginning work or of posting notices. However, such cases are extremely rare, considering the total number of claims located each year. Strictly speaking, a prospector cannot make a valid location before he has discovered mineral, but he has the rights of possession, except against the United States; and, while there is a conflict in the decisions on this point, in many cases the rule appears to be that, as long as he is working the ground and is in possession, the law will protect him, and when a discovery is made his location is good.

In any attempt to remedy defects in the present system of Federal mining laws, the underlying intent and purpose of existing legislation on the subject should not be lost from view. As was well said by the Assistant Secretary of the Interior in Cataract Gold Mining Company et al. (43 L. D., 248): "The intent of the general mining laws was to encourage and promote the development of the mining resources of the United States."

Proposed amendments of existing law, not based on this broad policy but having in view the exploitation of the public domain in the interests of individuals without corresponding benefit to the people as a whole, should meet the condemnation of every honest and right thinking man. Keeping in view, therefore, this beneficent purpose of the present law, let us consider whether the proposed elimination of the antecedent discovery requirement from the law will operate to give greater effect to such purpose.

It is contended that, if the requirement of an antecedent discovery of mineral within the lines of the claim located were dispensed with, the result would be to hasten the development of the mineral resources of the public domain and so increase the wealth of the nation; furthermore, that the present discovery requirement is an unnecessary hardship in a great many cases,

and should be dispensed with in justice to those who are honestly endeavoring to develop the mineral resources of the public domain.

It is urged that, if the antecedent discovery requirement were abolished, the one first staking out a piece of ground would be protected in his possession of it even if a later locator on the same ground were the first to discover mineral.

This raises the question, to whom should the desired reward (viz., exclusive occupation of the ground) be given? Shall it be to him who is diligent in staking out his claim, or to him who is not merely diligent in that respect but, not content with this, pursues diligence to the point of discovering the hidden mineral wealth? Which of the two is more deserving of reward? Which of the two is bending his efforts toward the consummation of the policy of the law? Certainly the one discovering mineral has performed a very essential act in the development of a mine.

In some mining districts where outcrops are few, extensive and expensive development work is necessary before valuable mineral is found. Many long and costly exploratory tunnels have been driven and shafts sunk to develop tracts of land on which occur no surface indications of veins or mineral, but which were favorably situated in mineral belts. Justification for prosecution of development work under such conditions depends to a great extent on a careful study of mineral showing on adjacent lands. The successful prosecution of such exploratory work is dependent on the raising of sufficient capital for the enterprise. The raising of capital, a difficult undertaking in connection with almost any project so essentially speculative in character as that of exploring for precious metals, is made more difficult if the promoters cannot show a fee-simple title to the property to be developed. Hence the abolishment of the discovery requirement would have the effect of overcoming this one obstacle to the development of our mineral resources.

When valuable ore bodies are found on unpatented claims, there is always the menace of litigation to prove the ownership of the ground. After a strike has been made, often abandoned locations, which at one time covered the land, are resurrected or the boundary lines of prior adjoining claims are moved in such a manner as to take in the more valuable ground. The indefinite manner of describing claims in location notices, and the great number of old illegible mining corners usually scattered over the landscape in mining districts, increases the difficulty of successfully defeating such contests. The richer the ore bodies found in these cases, the stronger the efforts to obtain the

ground by contesting claimants.

The danger of contests on unpatented ground after a strike has been made will be augmented if valid locations can be made without a discovery of mineral. Contests initiated by the locators of abandoned prior claims would be more likely to succeed if these claims had had a legal existence.

It may be well to say here, however, that it is not to be considered that all contests are not made in good faith. Locators of adjoining ground quite often do not know the position of each other's lines, and conflicts occur which were not known to exist until mineral survey is made for one or both of the claims. The contestants for conflicting grounds are usually honest in their belief that they should have the disputed area. Private contests against the issuance of patent for mining claims are being continually initiated by adverse claimants for all or part of the ground.

Sometimes a locator tries to get part of a prior location by getting his conflicting claim patented. I know of instances where valuable ground which was being held under location has been patented by a subsequent locator before the owner of the prior claim knew what was going on.

If we shut our eyes to actual conditions and assume that all locators of mining claims are in perfect good faith in staking out ground with intent to develop it for its mineral contents, there probably would be no necessity for the antecedent discovery requirement. But mining locations, even now, are made to cover a multitude of frauds against the public land laws. Title to valuable water-power sites, immense quantities of timber, and valuable townsites, have been secured under the mining laws. How much greater and more frequent would be these frauds if even a perfunctory discovery of mineral were not required to validate the locations. By far the greater number of mining claims which have been desired for purposes other than for mining have had no discovery of mineral.

Care should be taken that the interests of all the people are not sacrificed in our consideration of the welfare of the prospectors. The discovery requirement is designed, and operates, as a check on the disposal of lands of the people under the mining laws for purposes foreign to the intent of the law, viz., the speedy and bona fide development of the mineral resources of the public domain.

If the validity of the location is to be dependent merely on taking possession of the ground without the antecedent discovery of mineral, what is to prevent the staking of claims near pay ground, with intent to hold them for speculation and

hold-up purposes, and not their bona fide development for their mineral value, to a much greater extent than at present? What is to prevent the staking of claims by irresponsible individuals which can be held indefinitely by the doing of perfunctory assessment work, with the result that large areas of valuable ground are tied up for the purpose of levying tribute on those desiring to obtain the ground for mining or other purposes? Surely, to abolish the antecedent discovery requirement is to open the door to fraud and deceit incalculable, and the result will tend to block actual development of large areas for many years to come. The abandonment of the mineral discovery requirement would naturally facilitate the patenting of mining claims; but, however desirable it may be in some cases to expedite the granting of patents, I believe easy patenting on the whole will not benefit the mining industry, but rather retard it.

Most mining men know of many promising claims and prospects for which patents have been obtained and then, to all intents and purposes, abandoned. A large proportion of the applications for patent is made when the owner gets tired of doing the annual assessment work but still desires to hold the ground. Of such cases only a small number are ever worked again. Nearly 10,000 mineral surveys for groups of claims, from one to 30 or more each, have been made in the State of Montana alone, and this number does not include placer claims that have been taken up by legal subdivisions. While patent does not necessarily follow a mineral survey, it does so in nearly all cases, and of the patented claims only a small number have been worked since final certificates were issued. Outside of the Butte District, I will venture to say that less than five per cent. of the patented claims in Montana are now being worked at a time when metals are higher than at any time in the last fifty years.

In such active districts as Butte and the Coeur d'Alenes, where large capital is required in developing properties, the patenting of claims, on the whole, does not discourage new operations, but perhaps helps them. In cases, however, where one dominant company patents the whole surrounding territory, independent operators who would perhaps be willing to take a chance on developing some of this ground, if open, are thereby kept out. The patenting of the ground seriously handicaps the chances for small camps and new districts to become important producers. Numerous cases can be pointed out where the patenting of the claims has seriously retarded the development of camps, or altogether stopped it.

The majority of those who have written about the desira-

bility of amending the present mining laws have done so from the standpoint of the mining operator or prospector. None of the writers on the subject seems to have taken into consideration the effect that amending the law pertaining to mineral discovery will have upon the Government's administration of the public land. It must be borne in mind that this land belongs absolutely to the people of the United States as a whole, and their interest must be taken into consideration. It is not a no-man's land, as some people would appear to believe. Individual claims on it are allowed only by virtue of the laws of Congress, which prescribe the performance of certain definite requirements, and it does not belong to the first comer solely on his assertion of a claim to any part of it.

Many abuses have been perpetrated by unscrupulous locators of land under the mining laws. Mining claims have been, and are now, located to control springs, water-holes, range privileges, power and reservoir sites, town sites, rights of way, summer residence sites, timber and agricultural land, natural curiosities, and other surface values. While, at the present time, land more valuable for other purposes than for mining cannot be patented under the mining laws unless mineral has been found and the required expenditure made, in the past, before the Government inspected the ground before issuing patent, valuable areas have been patented when the ground was in no respect mineral. At the present time, in some parts of the country, public business is seriously interfered with by unscrupulous locators of ground under the mining laws. While the Government is now embarrassed by these hold-up locations (the mining industry at large has no idea how great the number is), the main expense is the examination of such claims and the delay caused by them. If, by amending the present laws, valid locations can be made anywhere on Government land without mineral discovery, no Government or other activity on public land will be safe from extortion and blackmail. Conditions are bad enough now. For instance: in some localities, as soon as a body of Government timber is advertised for sale, the timbered area and the ground over which the logs are to be moved to market is promptly located as mining claims, or old claims are revived, and heavy demands made for the use of the surface of the rgound. If, by law, claims of this sort can be made valid, it will give unscrupulous individuals a monopoly of the surface and prevent legitimate business over large areas. The owner of a single valid mining claim crossing a right of way of a logging road could exact a sum, for the privilege of crossing his ground, large enough to take all the profit from the logging

operations. As the cost of operation is directly related to what an operator can pay for the timber, the Government has a direct interest in all such cases. It has been repeatedly held by the courts that a valid location holds against the Government, even if abandoned for years. I know of areas from which the Government was contemplating selling the timber, on which there were as many as 100 abandoned mining locations. In such cases, if these locations had been valid without a mineral discovery, the locators, on reasserting their rights to the ground as soon as they found the timber was valuable, could have kept the Government from selling it. There is hardly a stream course or canyon, in many parts of the West, which at some time has not been plastered with locations.

Even if valid locations were permitted without a mineral discovery only on lands classified as mineral, it would still affect the Government, for there are bodies of white pine, which are advertised for sale from time to time, on lands in National Forests which have been classified as mineral but not covered by mining locations.

It has been stated that one must actually make a discovery of mineral on land within National Forests before he is allowed possession or allowed to prospect it. Such is not the case, however. A prospector or miner is in no way disturbed by Government agents in the enjoyment of his rights within National Forests. No examination is made of any ground located for mining purposes unless it interferes with the administration of the forest. A claim may interfere with the administration of the forest when it conflicts with areas occupied by individuals under what are known as Special Use Permits; when it is included within a tract from which the Government has sold the timber; or where the claim is so located as to control rights of way over which it is necessary to transport forest products. Unless the claims are actually interfering with the administration of the forests, no examinations are undertaken until applications for patent are made. The proportion of mining claims examined prior to application for patent is very small, probably less than 1 per cent. of the total number located. There are thousands of mineral locations within the National Forests of which no examination has been made by the Forest Service, and in all probability never will be until application for patent is made.

Mining locations within the National Forests which, after an examination by a competent man, are shown to be clearly invalid, may be disregarded as far as the surface is concerned, but no action is taken to dispossess the locator of the ground or no interference whatever is made with his development of the

mineral possibilities. In fact, the Assistant Secretary of the Interior has decided (Nichols-Smith case, unreported) that the Department has no jurisdiction over locations and has authority to cancel a claim only after an application for patent has been made. This decision, however, is now before the Secretary for consideration on motion for the exercise by him of his supervisory authority.

The fact that the Government has placed a large part of its domain within the National Forests shows that this land is valuable to the Government for the benefit of the people at large. This fact alone is an argument from the people's viewpoint that the requirements for patenting Government land, at least within the forests, by individuals should not be made easier.

I believe that, while sometimes the law requiring a discovery before a valid location can be made has worked hardships on prospectors, the wrong that could be worked under a law not requiring a discovery would be far greater.

Under the general mining laws, lands are not required to be chiefly valuable for mineral before they can be entered. The Supreme Court of the United States has held in U. S. v. Iron Silver Mining Co. (128 U. S. 673) that the fact that land may incidentally possess advantages other than its valuable mineral deposits will not preclude its disposition under the mineral laws.

An act of Congress of August 4, 1892 (24 Stat., 348) provided:

> That any person authorized to enter lands under the mining laws of the United States may enter lands that are *chiefly* valuable for building stone under the provisions of the law in relation to placer mineral claims.

The point of difference between this act and the general mining law applicable to mineral deposits is that the Act of 1892 requires the land to be chiefly valuable for building stone.

Power or reservoir sites situated on land containing no evidence of mineral deposits have been entered as stone placers, but the applications for patent have been rejected by the General Land Office. If valid mineral locations could be made on such lands without a mineral discovery, the land could be patented as mining claims.

If patent were allowed for Government ground as mining claims without a mineral discovery there would be very few, if any, power projects free for development at the present time, for the ground would be validly held or patented as mining claims. Most of the undeveloped available power sites on public lands have been included in power withdrawals or National Forests. The ground is therefore not subject to entry except as mineral

locations, and the only way to get a patent to such ground is under the mining laws. Nearly all power projects in the Northwest, where there is any possibility of early development, are on ground covered by mining locations. In some cases the mining claims are valid under the present law, but the great majority have had no mineral discovery. If the law is changed concerning mineral discoveries, there would be little new development of hydro-electric power without paying tribute to the kind of prospectors who had the foresight to locate mining claims covering the ground. Also, Federal control due to an interest in the site could be circumvented by first obtaining patent as mining claims to all the land affected. In the Northwest is a power project capable of developing 20,500 h. p. One-half of the land affected by the project is within a National Forest, and therefore the Government under the present procedure exercises control over the development of the site. The power would be developed under a special use permit issued by the Government, which requires certain conditions to be complied with. All of the public land has been located as placer mining claims, and if the claims were valid, the Government, under the present law, would have no control whatever over the development of the power. In 1913 a permit was issued to a company to develop the power, but for some reason it was not able to go ahead with the project. This company, however, acquired the mining locations, and if the claims could be patented the owners could prevent anyone else from developing the power site. Flour gold is found in gravel on all of these claims, but nowhere in paying quantities.

Another project with which I am familiar is capable of developing 331,000 h.p. by using storage, or 178,000 h.p. by utilizing only the minimum flow of the river. The lower 12 miles of this project, which is capable of developing 260,000 h.p. by storage, or 140,000 h.p. without, is entirely covered by mining locations. The area is within a mining district and would probably be classified as mineral, but only a very few of the locations have mineral discoveries. One side of the river is within a power withdrawal, and the other within a National Forest. In this case, as in the other, a permit was granted to develop the project, but it has not been done. The permittee has acquired the mining claims and he controls the site insofar as his mining claims are valid. If all these mining claims were valid without mineral discoveries, they could be patented and the Government would lose control of the project.

On March 1, 1906, Windfield Doern and two others located the Eagle placer mining claims alleged to be chiefly valuable for building stone, on the Stanislaus National Forest in California

(41 L. D., 655-659). On Oct. 25, 1907, the claim was conveyed to the Stanislaus Electric Power Co., who filed application for patent on April 5, 1908. The entry was contested by the Government. Stone was used from the claim in the construction of a dam on the claim, from which water was conveyed to a plant 15 miles below, where power was generated. It was proposed to build a second plant on the claim and bring water in a conduit from above. The patent was denied by the General Land Office, as it was shown at a hearing that the stone had no value outside of the construction of the dam, and for that purpose had no special value. The land, however, had value a sa power site.

On Jan. 2, 1907, H. V. Gates made application for patent under Act of Aug. 4, 1892, for the Excelsior placer, area 140 acres, in northern California. The patent was protested by the Northern California Power Co. At a hearing it was disclosed that the ground contained a deposit of basalt that had only a local use for building stone, such as the construction of a power dam, and was not so suitable for that purpose as other common rock. The claim covered a reservoir and tunnel site, and the claimant had a permit from the Forest Service to use a part of the claim for power purposes. The General Land Office held that the claim was more valuable for power than for building stone, and the entry was canceled.

On a river in a western state is situated a power site capable of developing 2490 h.p. The dam site is covered by an unpatented lode claim, and above the falls are situated four patented lode claims along the river in a row. Each of the four patented claims contains a valid mineral discovery, but no ore. Before proceeding to patent, the claimants received $5,000 from a power company for the privilege of flooding their ground.

Perhaps more fraudulent mining locations have been made to acquire valuable timber than for any other purpose on non-mineral land. If the mineral discovery requirement is repealed, large timber steals, which have been prevented in the past, will be successful. Many applications for timbered mining claims have been canceled after the Government has shown that no mineral discoveries have been made. It would not be possible to defeat such cases if the proposed change of the law is made.

Timber on patented mining claims can be disposed of by the owner as he sees fit. Timber on valid unpatented mining claims on proven mineral land outside of National Forests can be cut for certain described purposes, as approved by Congress by Act of June 3, 1878 (20 Stat., 88). Timber, however, on an unpatented mining claim within the National Forests cannot be cut for any purpose other than the development of the claim,

except by special use permit or purchase from the Government.

It has been a common practice in some localities to locate mining claims on non-mineral timbered areas, to give color of title to the ground while cutting the timber. Numerous suits have been instituted by the Government to recover the value of timber cut from such invalid claims.

In the case of Anderson v. United States (152 Fed., 89 to 91), Anderson, Baker and Sandlin located as placer claims 1200 acres of non-mineral Government land in the Boise land district, Idaho, from which was cut timber worth $17,751. Suit was brought by the Government to recover the value of the timber, and was successful.

In the case of Powers v. United States (119 Fed., 562), the Government brought suit to recover the value of 668,000 ft., b. m., of timber, worth $7241, which was cut from non-mineral Government ground. The ground was covered by mining locations made by a third party.

About ten years ago a company applied for patent for 3637 acres of Government land as placer claims. The magnitude of the case caused examination to be made by the General Land Office, and it was found that on one claim there was a small worked-out placer deposit of gold. There was no possibility of gold occurring in paying quantities on the rest of the group, although fine colors could be found almost anywhere in the county. This land contained an average stand of 15,000 ft. of white pine and other varieties to the acre, or about a total of 60,000,000 ft. on the group. The claims were continuous, but excluded and almost surrounded a small area from which the timber had been burned. The entry was protested by the Government, and at a hearing held to determine the validity of the group the claimants defaulted, thereby admitting the truth of the charges. The entry was finally canceled on Jan. 28, 1910. At this time there was being held unpatented fraudulent placer claims in this district which contained a stand of between 200 and 300 million feet of timber. During the summer of 1910, forest fires which destroyed the timber swept over this country, after which all of the timber-mining locations were abandoned.

In 1913 application was made for two groups of claims in Idaho. No mineral had been found on four of the claims of the group which contained a heavy stand of white pine worth $3800. After a hearing, the entry was held for cancellation by the Commissioner of the General Land Office.

In 1912 application was made for two claims in the Coeur d'Alenes, Idaho. This entry was also held for cancellation by the Commissioner of the General Land Office after a hearing.

These claims were completely surrounded by patented placer claims, but were situated on a small mountain. The ground was covered by a stand of white pine having a stumpage value of $3478. One of the claimants was interested in a saw mill situated near the claims.

Along in 1906 a mining company (long since defunct) did considerable development work on lode locations in western Montana, and located a large number of claims. The company failed to find any ore whatever, and went out of existence. The first year after the company abandoned the ground it was located by a man who did no more work on the ground. He relocated some of the claims for several years, but when no one else showed any desire to obtain the ground, he also abandoned it. In 1914 a lumber company secured timber on the river above these claims. After the lumber company cleared their right of way, the mineral locator came along, saw the situation and immediately reasserted his right to some of the ground which controlled the right of way. He demanded an excessive sum for permitting the company to cross his ground. His demands were refused and the logging operations shut down for about a year. An examination of the mining claims was made by a mining engineer, and it was found that the claims were invalid, as no mineral had been discovered upon them. After a year's delay the company constructed the logging road and commenced operations without any further trouble and without paying tribute to the locator. If these locations were valid without mineral discoveries, the logging operations could have been held up indefinitely unless the excessive demands of the locator were met. The claims are in a general mineral belt.

If valid locations of lode claims can be made in the future without a mineral discovery, many townsites are going to be held as mining claims. The following case is now before the Land Office for settlement. In 1909 a lode claim was located in such a manner as to take in all of the level portion of the canyon at the division point of a new railroad in Idaho. On June 27, 1913, application for patent was made. The section in which the claim is situated has been classified by the U. S. Geological Survey as non-mineral, and the land is in the Northern Pacific grant. The railroad has a station and some dwelling houses on the ground and part of the claim is also claimed by the heirs of a homesteader. If the mineral locator can prove a valid discovery on the claim, he is entitled to the ground. The railroad began operating about the time the claim was located. Practically a whole town with a population fo several hundred is on the mining claim, and there is no question that the ground is more

valuable for town-site purposes, for which it is being used, than for anything else. A large diabase dyke, in which can be found traces of copper, runs through the claim, but there is no indication that paying ore will ever be found upon it. Sufficient development work has been performed. If no discovery of mineral whatever is to be required, similar cases in the future can be expected to increase many fold.

The repeal of the mineral discovery requirement would open the doors for blackmail on all irrigation companies situated similar to the one in the following case, even when there is not a trace of mineral on the land. In 1910, application for patent was made for a placer situated in a small park in western Montana. Previous to the mineral application an application was made to the Secretary of the Interior for the use of the park for a storage reservoir site, for which purpose the ground is well adapted. It was proposed to impound water during the winter months and high water periods, to be used for reclaiming about 3000 acres of arid land. The reservoir permit was approved by the Secretary, but construction has not been begun on account of the placer claim. The Commissioner of the General Land Offices decided that sufficient mineral to constitute a discovery had not been made upon the claim, and it is now before the Secretary of the Interior on appeal. The park is an old lake bottom and contains sand, clay and gravel to an undetermined depth. This material all contains very minute quantities of gold, but in no place, as far as developed, in paying quantities. No serious effort has been made to mine the gravel, and for the last twenty years the ground has been used as a ranch by the claimant. If it is finally decided that the claim contains sufficient mineral for a discovery, the mineral claimant will be legally entitled to the land, and, before the irrigation system can be commenced, the land will either have to be obtained from him by purchase or by condemnation proceedings.

Throughout the country, attempts have been made to obtain possession of numerous springs, mineral or otherwise, by taking up the ground as mining claims. On Aug. 26, 1886, the Margaret Mining Co. made application for the Gray Eagle lode mining claim (11 L. D., p. 563) in King county, Washington. This claim embraced some springs known as the Hot Springs of Green River and were supposed to have great medicinal value. The entry was canceled by the Land Office as it was shown at a hearing that the land had no value for mineral but was used for a health resort and that the mining company was formed to acquire title to the hot springs.

By Act of Jan. 31, 1901 (31 Stat., 745) Congress provided

that "all unoccupied public lands of the United States containing salt springs or deposits of salt in any form and chiefly valuable therefor are hereby declared to be subject to location and purchase under the provisions of the law relating to placer mining claims." Under this Act, many mineral springs having no value whatever for salt, but having supposedly medicinal properties, have been located as placer claims.

On March 20, 1905, Henry Lovely made application for patent for the Lovely placer claim in the Juneau land district in Alaska. It was shown at a hearing that the ground was used as a health resort and water from two springs was conducted to bath houses, the cost of so doing being applied as mining improvements. It was also shown that the ground was not mineral or saline in character. The claim was canceled Feb. 13, 1907, by the General Land Office (25 L. D., 426).

By decision of April 14, 1913, the Secretary of the Interior held that the Salt Creek placer claims were invalid (21 L. D., 745). These claims were located in February, 1911, under the Act of Jan. 31, 1901, so as to cover a group of hot springs whose waters carried in solution common salt, Epsom salt, Glaubers salt, and other chemical substances. As compared with sea water, the waters of these springs were shown to contain about one-eighth as much common salt. It was held by the Secretary of the Interior, from facts determined at a hearing, that the ground had no value for the manufacture of common salt, but possessed distinct curative properties.

In central Montana is situated a mineral spring known as the Appollonaris. The ground at the small side gulch on which the spring is situated was located as a stone placer and the adjoining ground on the main creek as gold placers. No discovery of gold had been made on the gold placers, and the limestone on the stone placer was not valuable, on account of its poor quality and the distance from any market or railroad. This spring has a local reputation for medicinal properties and special use permits for erecting bottling works and hotel buildings on the area was desired by several parties. The development of the spring was held up for five years, but finally the parties holding the mining claims decided that they could not patent the ground and abandoned it. The spring is now being developed.

The abrogation of the mineral discovery requirement would greatly facilitate such fraudulent attempts to obtain ground desired for purposes other than mining.

Mining locations are made in a great many cases to obtain possession of agricultural land, sites for summer cottages, and for other similar uses. At numerous points desirable for summer

residences on the shore of Lake Pend Oreille, mining locations have been posted, and in many cases a pretense of doing the annual assessment work has been made. In a few cases application for patent has been made. On some of these claims sufficient mineral has been found to constitute a mineral discovery, but in the large majority of cases no mineral has been found.

The Frances placer, consisting of 20 acres on a bar on the Clearwater River in central Idaho, was applied for under the mining laws. The claimant had farmed the land for at least 10 years previous to making application. The mineral entry was contested and canceled in 1912, and the land was later taken as a homestead.

Mining claims have been patented, and others are being held as locations, on favorably situated scenic points along the rim of the Grand Cañon of the Colorado. Two lode claims also have been patented which cross the Bright Angel Trail. Tourists who have gone down this trail and paid their dollar each to the owner of the lode claim can realize his farsightedness in finding his mine just in this particular location. It is of interest to note that no commercial mineral has been found on any of these claims.

On the public domain there are numerous conflicts of mineral claims with homesteads. In all contests, the burden of proof is on the homesteader, as he has to prove the land non-mineral in character. If valid locations can be made without the necessity of a mineral discovery, the homesteader's lot in mountain valleys is going to be still harder to bear. If the mineral discovery requirement for the location of mining claims is abrogated, no form of activity can be safely undertaken on unpatented land, and it is difficult to anticipate the many abuses that can be perpetrated.

The uncertainty of ultimate possession of unpatented land in mineral belts could be remedied, I believe, by making provision by law for clearing title to the ground against all except the United States at any time, as is now done at the time of application for patent. If, after development, mineral is found, the ground could then be patented.

Perhaps the method now used in connection with homesteads on the public domain could be adapted to the making of mineral entries. In the case of homesteads on surveyed land, an applicant, at the time of going on the land, corresponding to the posting of a location notice on a mining claim, makes a filing in the U. S. Land Office, and, if no adverse claims are proven, and if the land is non-mineral, his entry is allowed. This excludes all other private claims to the ground, and, after complying with certain prescribed regulations, patent is then issued to the homesteader.

If all men were honest, or this country were a Utopia, it would be perfectly feasible to repeal the law requiring the discovery of mineral; but unfortunately such is not the case. Under the present law, some operators may have been unjustly obliged to defend their rights, but it has been found that laws made to restrain the unjust generally cause some of the just to suffer. By repealing this law, relief would be afforded to some who are acting in good faith, but at the same time it would let down the bars, allowing an unlimited amount of fraud, and foster blackmail. That the wrong application, if possible, would be made of any new mining laws, should be expected from the many frauds that have been perpetrated under the present laws. By far the larger part of the mining claims which have been desired for purposes other than for mining have had no discoveries of mineral. I believe that by suitable laws it is quite possible to ameliorate the one condition without aggravating the other.

John D. Pope.—The law should provide that locations must be established on the ground and recorded with the Land Office, so that the location can be shown on the Land Office maps and no conflicting locations should be allowed without trial by competent court. This can be done by either making locations by legal sub-divisions, or by compelling the survey of locations. At present, it is impossible to tell whether a location has any legal status or not, or whether conflicting or prior locations do or do not claim and own any or all of the ground claimed. In other words, a location may be perfectly good, or it may be valueless, by reason of conflicts, which cannot be determined by inspection of the ground or of the records, and until patent is applied for there is no method of determining this question. The result is that a mining location is practically unsalable.

If locations are made by legal sub-divisions, it would not be necessary for the prospector to pay for a survey, but it would not be unreasonably expensive for the Government to maintain, and pay by the month, deputy surveyors, whose duty it would be to make location surveys. If the Government is in the business of selling land, and incidentally encouraging the mining industry, it would be a good piece of business to do this. The Government surveys its farming lands and it might as readily survey its mining lands. I cannot see any merit whatever in locating claims along the meridian, and no reason for it. There is no more reason for locating North and South, than for locating in any other direction, and it would only bother the locator, without doing any good. Either locate by legal subdivision or allow the locator to place his claim as he thinks best.

This question is bound up to the extralateral-rights ques-

tion, and the extralateral right must be repealed if this other matter is to be rectified. I will not attempt to argue this extralateral-rights question, but think it would be a great day for the mining industry if it could be eliminated. If this is done, and if claims are made rectangular or square, and locations are recorded in the Land Office in such a way that conflicts are avoided before patent is applied for, it will give us a mining law which in *most* districts will be a satisfactory working law and encourage exploration of undeveloped districts.

F. A. Linforth.—Regarding discovery as prerequisite to location, I consider the present system the least of several evils. It approximates something definite and will help to confine prospecting to ground which has the best geological chances for future mining success. If discovery is not to be required, then we must wait for complete classification of all public land, which is likely to involve long delay. The work will be done by many examiners and the personal equation involved will be considerable.

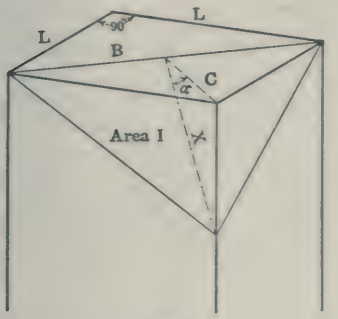
Discovery, even in its broadest application, is at least some evidence of good faith. It also gives the prospector something to develop. It is doubtful if the comparatively few ore bodies which give no geologic evidence of their existence on the surface would ever have been found, if some form of discovery had not been made in that vicinity. In this connection, however, I have always admired the Australian provision for continuous development. Some form of this provision might be arranged with a view to covering a multitude of sins. If a discovery is valid, continuous development will demonstrate it, and the claimant will demonstrate his good faith by so developing.

Many pieces of property with excellent showings have come to my attention, but it is doubtful if, under the present law, they will ever become mines. They have been held by relocation for years, and the badgers have done more prospecting in the vicinity than the owners, who are idly awaiting a million-dollar offer for their claim. As an alternative, might it not be possible to impose a high rate of taxation on claims not being developed? At any rate, it seems as if some such provision might well be made. It would work for the benefit of the prospector in the long run, and probably make some producing mines out of a large number of idle claims.

Regarding the size and shape of claims, the 660-ft. square with its sides on north-south and east-west lines seems to be adequate, but I suggest that they need not coincide with public land survey lines. If the claims are to be square it is almost necessary that they be given uniform orientation. A patchwork

made of rectangles laid at random with respect to the compass develops for more triangular and irregular fractions than with the present parallelograms, which are not necessarily rectangles. The suggestion that the new claim shall not necessarily coincide with a public land division is made so that a claimant can get the maximum vein from the minimum number of locations. The position of the vein outcrop is fixed, and it might work considerable injustice if the position of the claim were also fixed. It is conceivable that a man might have to take up four claims to cover the same length of apex which he could get with one or two, if allowed to move them parallel to the public land survey lines.

The claims will always have to be surveyed anyway, and they can be readily tied into the section corners by latitudes and departure.



Case I

I. *Diagonal Vein.*

L = length of side of claim.

Area of vein = $\frac{1}{2} B X$ ..... (1)

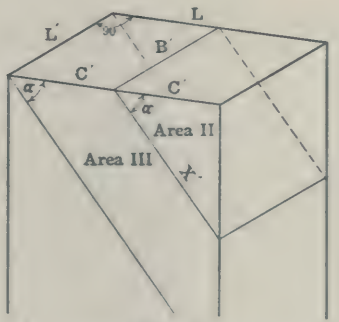
$B = \sqrt{2} L$ $\quad$ α = any angle of dip.

$$\frac{C}{X} = \cos \alpha$$

$$\therefore X = \frac{C}{\cos \alpha}$$ $\quad$ Now $C = \frac{1}{2} \sqrt{2} L$

$$\therefore X = \frac{\frac{1}{2}\sqrt{2} L}{\cos \alpha}$$; or, substituting in (1)

$$\text{Area I} = \frac{1}{2}\sqrt{2} L \frac{\frac{1}{2}\sqrt{2} L}{\cos \alpha} = \frac{1}{2} \frac{L^2}{\cos \alpha}$$



Case II

II. *Vein through central diameter.*

Area II = $B' \times X'$ ..... (1)

$B' = L$

$$\frac{C'}{X'} = \cos \alpha \quad \therefore X' = \frac{C'}{\cos \alpha}$$

Here $C' = \frac{1}{2} L$

$$\therefore X' = \frac{1}{2} \frac{L}{\cos \alpha}$$

Substituting in (1),

$$\text{Area II} = L \times \frac{1}{2} \frac{L}{\cos \alpha} = \frac{1}{2} \frac{L^2}{\cos \alpha}$$

Area III = 2 × Area II.

The geometric features involved with regard to the amount of vein included in a square claim bounded by vertical planes, are interesting. If an outcrop can be made to pass along the diagonal of a square claim and the vein is vertical, the vein area is maximum. If the outcrop is on the diagonal but the vein dips in either direction, the ownership is cut off by adjacent side planes and is exactly the same as if the outcrop lay along a central diameter. If the outcrop is made to lie near a sideline, and parallel to it, and the vein dips into the claim the ownership is twice that of the vein laid along the diagonal or the central diameter, provided it has the same dip. It is therefore possible to obtain various ownerships by sliding a square claim parallel to the cardinal points of the compass, and it is not generally necessary to turn them parallel to the vein to obtain the best results. The 10-acre unit is probably better than the larger one, especially if the tract can be placed to the claimant's best advantage. There is more flexibility in the system using the smaller unit and no particular hardships on the owner who desires greater acreage.

Lee Hayes.—I. Public lands should be surveyed as soon as possible. But why make a classification into mineral and non-mineral lands, since a better time to determine that question would be when application for patent was made? It is evident the classification should not be final, unless it was a true classification. It would be much better to take up one case at a time than to make a classification which might be subject to change by hearings in the Land Office.

II. A change should be made in this section so as to eliminate the words "when located on surveyed land," and require the Government to survey the lands before granting patents; locators in the meanwhile holding their claims as at present by keeping up annual labor. The locator could be protected in his final rights by allowing him the two contiguous 10-acre tracts lying nearest his initial location notice, his notice being upon one of the tracts.

III. A limit should be placed upon the number of locations that can be made in the same mining district by one person or association. Better still would be to make the limit apply to each section of the public surveys. "The actual discovery of a valuable deposit not necessary to a valid location," is a good provision, providing the $100 be expended, as required in IV, for the first year as well as for the following years.

IV. The clause permitting excess of labor performed in one year to be carried over to other years should be omitted. The $100 per year should be the same as a permanent tax.

V. This article would clear numerous placer titles, and

forever dispose of the question whether a vein was known to exist on the placer at the time of patent.

The amendment to article II would result in the location of none but 40-acre tracts, because the annual labor required would be at the rate of $50 for each 10 acres. The law should allow 10 acres for each location, with $100 annual labor.

C. W. Goodale.—The mining laws of British Columbia have been in force long enough to disclose objectionable features, but inquiries have never brought out any serious criticism from those who are familiar with them, and with their practical application. Without going into details, the main features are as follows.

1. A "Free Miner's Certificate" must be obtained from the Mining Recorder's office, at an expense of $5 per year, which gives the prospector the right to make locations on Government land.

2. Mineral locations may be 1500 ft. long and 1500 ft. wide, as nearly as possible in rectangular form; and the owner has the right to all the mineral within the surface boundaries of his claim, but no extralateral rights.

3. "No free miner shall be entitled to hold in his own name, or in the name of any other person, more than one mineral claim on the same vein or lode, except by purchase, but such free miner may hold by location a claim upon any separate vein or lode."

4. No mineral claim of the full size shall be recorded until "mineral has been found in place on the claim proposed to be recorded," and record of a mining claim with the Mining Recorder must be made within 15 days after the date of location, an allowance of more time being made for a distance of more than 10 miles from the Recorder's office.

5. Assessment work to the extent of $100 must be done each year, but in lieu of work, $100 may be paid to the Mining Recorder.

6. After the expenditure of $500 in work, or the payment of that amount to the Government of British Columbia, any lawful holder of a mineral claim shall be entitled to a Crown Grant.

There is grave risk of abuse of privilege if we do not retain our own law and follow that of British Columbia in requiring the discovery of mineral before location and record. This has been fully shown by Mr. Gardner and others, and no further discussion is needed on this point.

Mr. Pope has brought out a subject on which there has been much debate—the importance of having the Land Office of the Government advised of every location. Under present conditions, the only record of location is in the County Recorder's

office, and the books of that officer do not pretend to classify the claims by districts. While it is true that the Mineral Examiners of the Forestry Service have some knowledge of locations made in the Forest Reserves, they do not cover all the Government land, and they are not expected to make surveys which will fix the boundaries of locations against all possibilities of "floating." If the deputy mineral surveyors were under orders to make surveys of all claims when located, or as soon thereafter as possible, and furnish the plats to the land office, there would be little chance of incidents such as the following:

In 1876 a location was made by "A" of a claim which soon proved to be one of the great gold mines of Montana, but which, through an error of the locator, was so placed that the vein crossed its sidelines. Another claim was located in 1878 by "B" as a southerly "extension," but this was before the true strike of the vein in A's location had been determined, and B's location failed to cover any portion of its apex. In 1880 high-grade ore was found by "C" several hundred feet south of A's claim, and a new location was made. There was abundant evidence to prove that B, in surveying his claim for patent in 1881, moved his south end corner stakes to such an extent that C's discovery was included in B's claim, or, in other words, B "floated" his claim. This would have been impossible if there had been a survey of the claim soon after the location was made. As a consequence of this action, and of a compromise, with resulting controversies over extralateral rights, the interested parties got into litigation, which continued for 16 years, and C, or his successors in interest, lost the battle.

Many other instances of this kind have come to the knowledge of the deputy surveyors in Western mining districts, and there should be some protection to the honest locator, even if the Government takes the position that it does not require any information regarding locations until application is made for patent.

Samuel Barker, Jr.—The provision to survey the public lands is a good one, but to do this will take considerable time. This is true, more particularly, of the mineral areas, because they are for the most part in mountainous regions. To classify the lands containing the valuable minerals is, I think, useless. Allow all public lands to be open for exploration. No restriction should be put on the prospector, for there are a great number of instances where the prospector has explored places condemned by geologists, engineers, and Government inspectors, and has found mines.

A claim should be 1320 ft. square, but need not conform to the cardinal points. No extralateral rights. A great deal of uncertainty is linked with placer patents. In Butte, a great deal of litigation has arisen over the known vein, excepted in placer patents. Some placer claims have been patented since 1875, and yet any one can make a location and bring action in the courts to quit title to such vein. For the most part, the placer claims produced gold, but bedrock now exposes veins. Some time limitation should be created, after which the placer patent can not be attacked. Now that the mineral inspectors of the Government inspect all placer claims that apply for patent, there is little chance of fraud; hence a five-year statute of limitation could be applied to placers as well as to lodes.

I do not approve of the hearings that are held under authority of the Land Office. There is no bar to the amount of testimony, or its character, in land cases; in fact, a man of ordinary means cannot engage in land contests, because the stenographers' costs alone in most cases are more than the total cost of a court proceeding. In cases that I have been connected with a great abuse has arisen in the character of the testimony introduced. Relief would be afforded to the Land Office if all cases relating to mineral contests were tried by the courts.

In the matter of "No discovery required to initiate a mineral location": I believe such a provision would be a catastrophe in most mining sections. If one does not have to discover mineral, why classify the public lands or have mining claims at all? Even with the provision that, to locate a mining claim, mineral must be discovered thereon, a great number of locations are made just for blackmail. These locations are made to cover railroad rights of way, ditch and flume lines, reservoir sites, and the like. If no discovery is necessary to initiate a claim, locations can be made to take up power sites, reservoir sites, timber lands, and ground valuable for purposes other than mining. A case in point is cited in a recent number of the *Saturday Evening Post*, concerning locations along the Cañon of the Colorado. If a corporation desired to build a reservoir in a mining community, and the information leaked, the ground could be plastered with locations, not for the purpose of doing mining, but for blackmail. I was a witness in a case involving a reservoir site, about 18 months ago. Locations had been made covering a portion of the site. A locator of one of the claims was on the stand and he was asked if the claim was valuable. It was. For what? To get money from the water company, of course. Now, if such a condition can be set up under the present law, how much worse will it be under the "no discovery" idea. In a great measure it

does away with the prospector. He digs to find something; if no discovery is necessary, he is not going to locate a claim and wait for representation time to do his work. He will not make a location unless he finds mineral; that is why he is prospecting, trying to discover mineral. I believe such a provision would seriously retard mining development.

In regard to filing the locations in the Land Office, this would be a safeguard to investors; but the Montana land offices have so much work now that I am fearful of such a scheme. The main thing at present is to do away with extralateral rights, and when patent is granted, have no exceptions in it, but make the grant absolute.

Nevada Mine Operator's Association.

The following letter, dated at Reno, Nev., Aug. 8, 1916, has been received from the Secretary of the Nevada Mine Operator's Association, and is gratefully acknowledged as a valuable contribution to our discussion of mineral-land law revision.

The memorandum adopted by the New York section of your Society, concerning the revision of the Federal mining laws, as contained in the Society's bulletin No. 96, together with your Secretary's letter of July 10 addressed to Mr. John G. Kirchen, President of this body, in which you invite criticism of the proposed changes, were considered at a regular meeting of the Executive Committee of this Association on July 29, 1916, with the following results:

The first recommendation, pertaining to the survey and classification of the public lands, meets with the approval of the Committee.

Those provisions of the second paragraph, governing the size of mining claims and the method proposed for the determination and adjustment of overlapping boundaries, are also approved. The Committee, however, is opposed to that provision which requires that all claims be located as subdivisions of surveyed sections and with boundaries extending north and south, east and west. We believe that a locator should be permitted to locate his claim along the length or strike of a vein. We do not think that he should be compelled to acquire an extra claim in order that he may include a short extension of a vein which might run diagonally through his first location and emerge in a corner of the second. We believe that the location of a claim in the manner suggested in the memorandum would be a matter of considerable difficulty. It would ncessitate the finding of section corners or other legal monuments, and might require a preliminary survey before location. It frequently happens that

a great deal of labor and time are consumed in an endeavor to locate section corners. The Committee further believes that the discovery of new mines is almost entirely dependent on the prospector. The method you propose is highly complex and would tend to confuse the ordinary seeker of metal-bearing ground; consequently the manner of making locations should be as simple and as free from burdensome restrictions as is possible to make it. Prospecting should be encouraged rather than discouraged.

All of the provisions in the third paragraph are approved, and particularly that portion changing the present law which requires the discovery of mineral in place.

We do not approve the recommendations regarding a change in the annual assessment requirements. Rather would we suggest that the present law be safeguarded and more rigidly enforced. We believe that the holder of a mining claim should be compelled to make an actual expenditure of $100 annually in the legitimate development of his property. We suggest that the present optional provision of making affidavit of the amount and character of the work performed be made a compulsory one. We further suggest that a severe penalty be provided for the uttering of a false affidavit. We believe that the local land office should see to it that this provision is rigidly enforced. We are convinced that no other section of the mining laws is more often or more grossly violated than is the present annual assessment provision. We are opposed to the proposal that an excess of the required annual expenditure made in any one year be applied on the requirements for succeeding years. This, we think, would be open to fraud. Moreover, it would serve indefinitely to tie up properties that were apparently abandoned, but on which a large expenditure had been made at some former time. It is a known fact that many successful mines have been developed from claims that were several times abandoned.

We heartily approve the recommendations in paragraph 5, in which the extralateral rights doctrine is done away with. We also approve the patent and recording regulations proposed in the sixth paragraph.

This Association is heartily in favor of a revision of the mining laws and, while we do not approve the recommendations of the New York section of your Society in their entirety, we stand ready to assist in any way we can. The differences outlined in this letter can certainly be adjusted before the bill is finally drafted. Until that time we shall be pleased to receive and consider whatever suggestions your Society or any of its sections may offer.

Mining Leases on Mineral Lands.

The following letter has been received in answer to the communication of Hon. Carl Hayden (Bulletin 98, p. 146) accompanying his proposed draft of a bill (H. R. 12,426) to control the leasing of mineral lands in Indian reservations.

J. H. Polhemus.—As the Hon. Mr. Hayden's bill now reads there is a great opportunity for confusion and evasion in making royalty settlements.

In the first place, small lessees seldom sample the ore hoisted from the ground, and have few definite metallurgical figures except the weight and assay of the shipping products. Very often a large amount of waste is sorted, containing more or less mineral but of no present recoverable value.

To avoid confusion, a royalty on the gross bona fide sale prices of all shipping products would be preferable, the title to all tailings or other waste products to remain in the land owner. This is the standard practice in the Joplin district, where probably more leasing is done than in any other mining district in this country.

Section 8, H. R. 12,426, should also be amended to read: "* * * a royalty which shall be *at least* five per centum of the gross value." A large acreage of Indian lands is now under lease in the Miami, Okla., zinc field, where royalties as high as 30 per cent are being paid, the Indians, in some cases, receiving a very small proportion.

Press Comment.

The "Chloride Herald," of Chloride, Ariz., in a recent issue expresses itself very frankly with regard to the Mining and Metallurgical Society of America and also with regard to the proposed revision of the mining law. The remarks of the Chloride Herald are as follows:

We publish below the changes suggested by the Mining and Metallurgical Society of America in the interest of the Morgans, Rockefellers and other pirates. Every miner should read this carefully, especially Section 4, to the vicious provisions of which we have referred in a previous issue of "The Herald," and every miner and operator should then write his State's representatives in Congress to fight the proposed changes to a finish. If you really want these crooks to monopolize the mineral resources of the United States, say nothing and they will get there all right.

CHANGES OF ADDRESS.

Howland Bancroft .....Casilla 215, Oruro, Bolivia
H. V. Winchell.....Minneapolis, Minn.
826 First National-Soo Line Bldg.
George J. Young.....Colorado School of Mines, Golden, Colo.

PERSONALS.

Ralph Arnold is in Venezuela, where he will conduct investigations in the petroleum districts.

Pope Yeatman will resume his independent practice as consulting mining engineer, beginning Sept. 1.

Edwin S. Berry will take up independent consulting mining engineering in New York after Sept. 15.

P. A. Robbins, manager of the Hollinger Consolidated Co., in Ontario, has been elected a director and made managing director of the company.

H. O. Hofman, Professor of Metallurgy in the Institute of Technology, Boston, has visited the lead smelters at Chicago, Omaha, East Helena, Northport, Trail, Shelby, and Tooele, and was recently at San Francisco and Salt Lake City.

John W. Finch has gone to China to make investigations for an important New York syndicate which contemplates making important mining explorations and developments in China and Siberia.

H. W. Gepp is at Winthrop, Cal., conducting experiments in the Bully Hill plant with a view of determining the applicability of the process of electrolytic zinc extraction to the treatment of the Broken Hill sulphides.

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Executive Committee

J. R. Finlay
L. D. Huntoon
A. S. Dwight
Geo. C. Stone
W. Lindgren

Annual Medal

H. S. Munroe, *Chairman*
James F. Kemp
Arthur L. Walker

Professional Training

A. L. Walker, *Chairman*
F. W. Bradley
Sidney J. Jennings

Mine Taxation

J. R. Finlay, *Chairman*
E. T. Conner
H. C. Hoover

Standardization

C. R. Corning, *Chairman*
J. Parke Channing
Geo. C. Stone

Welfare of Mine and Metallurgical Employees

J. Parke Channing, *Chairman*
R. M. Catlin
W. Y. Westervelt

Mining Law

H. V. Winchell, *Chairman*
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F. W. Smith
C. W. Goodale
M. L. Requa
S. W. Mudd
Albert Burch

Delegates to Cooperative Committee on Mining Law

H. V. Winchell
J. Parke Channing
R. A. Parker
S. W. Mudd
M. L. Requa

PAST PRESIDENTS

Henry S. Munroe.....1908-1909
J. Parke Channing....1910-1912
Henry M. Chance.....1913
James F. Kemp.....1914
W. R. Ingalls.....1915

FORMER SECRETARIES

J. R. Finlay 1908-1909
Henry S. Munroe 1910
W. R. Ingalls.....1911-1914
F. F. Sharpless.....1915

ANNUAL MEDAL

1914 { Herbert C. Hoover / Lou Henry Hoover
1915 Robert H. Richards
1916 James F. Kemp

Mining and Metallurgical Society *of* America

Vol. IX September 30, 1916 No. 9

ANNOUNCEMENTS.

Council Meeting.—The meeting of the Council called for September 21, to consider the matter of the revision of the mining law, was postponed owing to inability to secure a quorum.

Mining Law Committee.—The President of the Society has appointed W. R. Ingalls vice-chairman of the Committee on Mining Law.

Mining Law Revision.—The Council is holding a vote by letter ballot on the subject of submitting points involved in revision of the mining laws to a referendum of the membership. Elsewhere in this bulletin is published the questionnaire that it is proposed to issue. There is also published a summary of comments by the Committee on Mining Law with regard to the several points of this questionnaire. If a majority of the Council votes favorably upon the holding of the proposed referendum, the ballot will be issued immediately. It is proposed, however, that the same questionnaire be sent to all the societies which co-operated in the convention in Washington in December, 1915, with the request that they obtain a similar expression of opinion among their own memberships.

L. D. Huntoon,
Secretary

REVISION OF THE MINING LAW.

The Council of the Society is holding a ballot upon motions to obtain the opinion of members of the Society on points involved in a revision of the present mining laws of the United States. The motions are as follows:

1. That there be an immediate referendum to members of the Society of questions involved in drafting a new mining law.
2. That the questionnaire be similar in form to what was mailed to members of council on Sept. 12, 1916.
3. That organizations co-operating in the convention in Washington in December, 1915, be invited to hold a similar referendum, or obtain an expression of the opinion of their member-

ships according to the provisions of their by-laws, at the same time that the referendum of the Mining and Metallurgical Society of America is being held.

The questionnaire that it is proposed to submit to the members is the following:

1. Shall it be aimed to preserve to the maximum possible extent the phraseology of our present mining law and its principles of administration, thus retaining the benefit of some of the wealth of legal definitions that have been rendered at great cost?

2. Shall the new mining law be made to cover all classes of valuable mineral deposits other than coal, and shall that intention be defined so clearly that there will be no misunderstanding of it?

3. Shall actual discovery of a valuable mineral deposit be necessary to a valid location of a claim?

4. Or shall the new law authorize mineral locations *without* discovery in any part of the public lands officially classed as mineral; and mineral locations *upon* discovery in any part of the public lands whether officially classed as mineral or non-mineral?

5. Shall there further be a provision permitting bona fide prospecting on land classified as non-mineral and protecting the prospector in the meanwhile?

6. Shall Article 4, if adopted, be further limited so that patent may not be secured until a discovery has been made?

7. Or shall discovery or nondiscovery be immaterial in patenting?

8. Or shall there be required a considerably larger payment for land patented without discovery than with it?

9. If Article 6 be adopted shall there be the proviso that only one discovery need be made for a group of contiguous claims of one ownership?

10. Shall mineral claims hereafter located be 660 ft. square; i.e., 10 acres in size and square in form?

11. Or shall they be 1,320 ft. square; i.e., 40 acres?

12. Or shall the claim unit be 660 ft. square, with the proviso that when four units be located in a square of 1,320 ft. sides only the exterior corners (or lines) need be staked?

13. When the proposed square claims are located on surveyed land, shall they be required to be sub-divisions of the surveyed sections?

14. If not located on surveyed land, shall it be required that the boundaries run north and south and east and west?

15. Shall the number of claims locatable by one person or association be limited or unlimited?

16. If limited, what shall be the limit?

17. Shall existing regulations concerning the marking, notice and record of location be continued?

18. Shall there be the requirement that within 90 days after the date of location, record thereof shall be made in the U. S. Land Office of the district?

19. Or shall the time allowed for recording be more or less than 90 days? If so, what?

20. Shall the annual assessment work be at the present rate, viz., $100 per 20-acre claim, i.e., $5 per acre?

21. Shall it be provided that an equivalent sum of money *may* be paid into the U. S. Land Office in lieu of the performance of assessment work?

22. Or shall it be provided that an increased sum of money —say $7.50 per acre—*may* be paid into the U. S. Land Office in lieu of the performance of assessment work?

23. Shall a person or association holding a group of contiguous claims be permitted to do the assessment work upon one claim and thereby hold the group, the amount of such work to be equivalent to $5 per acre for each claim of the group?

24. Shall a person or association doing assessment work in any one year to the value of more than $50 per 10-acre claim be given credit for the excess in succeeding years, providing, however, that no fractions of $50 shall be considered for this purpose? (If the claim unit be 40 acres, these figures would be raised to $200.)

25. Shall there be emphatic provisions to insure the honest performance of annual assessment work?

26. Shall it be provided that in performing assessment work labor shall be reckoned at the current rate of wages for miners in the district? Or at some other rate; and if so, what?

27. Shall it be required that every holder of a claim shall file annually a record of his assessment work, accompanied by vouchers, in the Land Office of the district?

28. Shall proceedings for patent remain as now?

29. Shall proceedings for patent remain as now with the proviso that only the exterior boundaries of a group of claims need be monumented?

30. Shall proceedings for patent remain as now with proviso that absence of records in the Land Office of conflicting locations shall be taken as prima facie evidence that none exist that are valid?

31. Article V of the memorandum adopted by the New York Section reads as follows:

"Subject to the existing extralateral rights of mining claimants or patentees, the holder or patentee of a mining claim located hereafter to have the exclusive right of possession and en-

joyment of the surface held by him and of the minerals under it, bounded by vertical planes passing through surface boundaries of said land, but not the right to follow any mineral deposit beyond said planes. And the holders or patentees of claims heretofore located to have similar exclusive possession of all the mineral in said claims that is not covered by any existing extralateral rights."

The above article abolishes extralateral right in so far as any claims hereafter to be located are concerned. The extralateral rights of existing claims may not be taken away, however, wherefore any new location and grant of patent may be made only with the reservation of such rights. The rights of existing claims having been thus expressly preserved, the last sentence of this article confers upon previously located claims the rights to everything comprised within the vertical projection downward of their side lines that is not legally claimed by anybody else, this being thus an addition to the original extralateral rights.

The above article has received general approval, with scarcely any criticism. The following question is therefore put directly to the membership.

Do you approve Article V of the New York memorandum, or not?

32. Shall it be provided that final entry and payment be made for such claims within seven years after date of location, exclusive of the time covered by pending adverse claims? Shall the time allowed for this purpose be more or less than seven years; if so what?

33. Shall the new law provide for appeals from decisions of the U. S. Land Office to a court of competent jurisdiction?

The Committee on Mining Law, to which the Council referred the memorandum adopted by the New York Section on April 19, 1916, has not made any formal report as yet; but the following is summarized from communications received from the several members of the Committee and is here published as being illuminating with respect to some of the matters that are included in the above questionnaire.

EXCERPTS FROM THE CORRESPONDENCE OF THE COMMITTEE.

The identity of the authors of these communications being confidential, they are here indicated by letters rather than by names.

A. Since I am convinced of the vital importance of the mineral industry in our national affairs and believe that the day may come when this industry will show a declining tendency,

and since I believe further that it has been and is a serious error in policy for our Government so to dispose of agricultural, ranching, town-site and desert lands, as to retain neither the title to the minerals beneath them nor the right to permit their exploration for minerals by any bona fide prospector, so now I am in favor of the adoption of a principle somewhat as follows (and this will be found entirely in accord with many former declarations of principle by Congress):

Title to ores and minerals beneath the surface shall be conveyed only by and under the laws relating to mines and minerals, and no other form of patent shall be construed to convey valuable minerals except sand, earth, clays and building stone, whether said land be at any time classified as mineral or non-mineral. Furthermore, while in every case the surface proprietor should have the preference and certain privileges in connection with the location and operation of mines of whatever sort, which may be contained in his land, yet he shall never have the right to obstruct the entry upon his premises and the operations of any prospector who desires to search for minerals, provided that said prospector by his operations shall not injure or destroy buildings, ditches, roads, etc., and must always compensate the surface proprietor for the value of land occupied and for damages to the surface, etc., all of which shall be subject to appraisal by appraisers appointed by the court.

I am very thoroughly convinced of the importance of this principle. When our public domain is exhausted, as it soon will be, there will no longer be ground for the prospector. He will be hounded from private territory as he is now practically from national forests. Unless he is given some open and recognized right of entry on privately owned land, mineral discoveries will in a few years or decades dwindle to the vanishing point.

I am not in favor of 10-acre unit claims, but do believe that in every district where the land has been subdivided by United States land surveys the unit should be any 40-acre tract or established lot or fraction indicated on the township plat and no other, that the number of claims located by a person or association in any one district should have some limit, and that final entry should be made within seven years.

Registration should be required in both the United States Land Office and the office of the County Clerk and Recorder, or else the Land Office should be required to file notice with the County Clerk and Recorder within 60 days.

I am sure that many of our members do not keep clearly in mind the difference between location of a claim for the purpose of prospecting it and final entry for the sake of acquiring a patent. That this is true is indicated by much of the discussion

and by the further fact that while the memorandum[1] as drawn provides for location without discovery on land which may be classified as mineral, it does not anywhere provide that a discovery is necessary before issuance of a patent. It certainly is not my idea to make it possible for anyone to get patent to a piece of land under the mining laws without actually finding ore, but I do believe that the prospector should have exclusive possession of his location while he is trying in good faith to make a discovery.

B. I am inclined to agree with the propositions to permit location without discovery upon any classified mineral land, and with discovery upon any land, but if these are adopted, would it be wise to allow payments to be made to the Land Office in lieu of the performance of assessment work?

It was my opinion at first that abuses of this privilege would surely occur. Locations for purposes other than mining would be made on land not classed as mineral, and the locator might be very willing to hold the land at a cost of $5 per acre, paid to the Land Office, when he had no reason whatever for believing that it would ever produce mineral; but on the other hand the Government would be receiving a fair income from the land, and if the locator were compelled to make final entry within a fixed time, say seven years, and then only on affidavit in the present form, he would be unable to get good title through an evasion of the law.

The present form in applying for patent reads as follows: "That there is a true fissure vein, lode or ledge with well defined walls carrying gouge, within said claim, having an average width of..... feet, running in a ..... and ..... and containing quartzose vein matter carrying iron and copper pyrites, and there is blocked out or in sight ..... tons of ore therein of an average value of ..... dollars per ton.

That there has been a large amount of money expended on said ..... vein, lode or ledge, mining ground, claim and premises by said corporation, the applicant for patent herein, and by its grantors, to wit: ..... dollars in running a tunnel ..... feet long with drifts, crosscuts, and stopes therefrom; and there has been extracted from said vein, lode or ledge more than, to wit: ..... tons of ore of the value of about ..... dollars per ton." "Ricketts on Mines," 1911, p. 393.

(By the way, I have had no experience in getting patents on "disseminated ore-bodies." How have the patentees got around the specification describing a "true fissure vein?")

We can imagine a case where a locator discovers valuable

[1] Of the New York Section.

mineral on land which had not been classed as mineral, and for self protection he would locate other claims on adjoining ground for a wagon road, rope tramway, or other means of outlet to a railroad, wagon road or river, and with no indications which would lead him to explore the ground for mineral. With the privilege of paying $5 per acre to the Land Office, he would be able to head off adventurers who might try to harass him. The agents of the Forestry Service would doubtless oppose a plan which would permit such locations, and with reason, for this would allow locators to take up valuable timber land, with a view of realizing on the timber.

C. The only novel suggestions which I have to make are with respect to a number of claims locatable by one person, and proceedings for patenting. As to the former, the plan I suggest is similar to that sometimes adopted by foreign countries in the matter of concessions. They give a similar right to explore a large section of territory within a specified period, but require that a smaller section be finally selected and the remainder relinquished for the use of the Government or others. It strikes me that in view of the fact that in the future mining operations in this country will have to deal more largely with extensive low grade deposits than with the small high grade veins which are readily discoverable upon the surface, an opportunity should be given the locator of claims to include within his original locations sufficient territory to cover all of any given deposit which could be worked economically as a unit. It strikes me that two years would be sufficient time in which to determine what part of the original location could be advantageously worked in this manner, and that the remainder should then be thrown open to exploration by other parties. I have suggested 15 claims of 40 acres each, equal to 600 acres, which even for "porphyry coppers" ought to be large enough.

Two years will probably be sufficient too for the determination of the strike and dip of smaller veins, enabling one to learn what claims he should hold in order to protect his vein upon its dip.

With reference to patenting, inasmuch as the claims under the proposed new law would have no extralateral rights, it would be unnecessary to define accurately the lines of interior claims, but because the public land surveys are usually inaccurate, it is desirable that the exterior boundaries should be accurately marked upon the ground. Second, it has been contended that claims should not pass to final entry without the discovery of mineral within their boundaries. The only reason that I can see for this requirement is to prevent the acquisition of land under the mineral land laws for purposes other than mining. On

the other hand there may be several strong geological reasons for the belief that valuable mineral deposits exist beneath the surface of a certain claim and yet, in the orderly working of the mine, it may not be convenient to actually expose such deposits within the seven-year limit.

I approve the recommendation of another member that hereafter grants of land under any law other than the mineral land laws shall not convey title to valuable mineral deposits underlying such land; but that all public lands so granted hereafter shall be subject to exploration by citizens of the United States for the discovery of mineral deposits; that the owner of the surface have preference over others in such exploration; and that he shall be properly compensated for any injury which his land or improvements may sustain by reason of such exploration by others than himself.

I do not approve the suggestion that in lieu of annual assessment work an equivalent sum may be paid into the Land Office, but I believe the payment of a 50 per cent. greater sum should be allowed.

In patenting a group of contiguous claims no survey should be required except such as is necessary to mark exterior boundaries. Should no discovery of mineral have been made within the limits of a claim before final entry, the price charged for the land should be $100 instead of $5 per acre.

D. I believe in the separation of surface and mineral rights. It works well in Mexico.

I favor abolishment of the demand for a discovery, and I go further. A colleague says, "It, ... is not my idea to make it possible for any one to get patent to a piece of land under the mining laws without actually finding ore." I want to enter the strongest kind of a plea against any such limitation. In patent proceedings the demand for a discovery has been the curse of camps like Bisbee. Under Secretary Fisher for a while it practically put a stop to patenting there. To permit locating without discovery would be to accord legal sanction to a practice that is all but universal in camps with blind surface. The trouble that has been caused by the discovery clause has chiefly been in patenting. If the distinction be drawn, permitting possessory title without discovery but demanding it before title in fee can be granted, we had better let the law stand as it now is.

Consider a case: X is developing a group of 12 claims, three wide and four long, and gets ore in two claims at opposite corners of the group. He has not found ore in the other 10, but has hopes and spends some money every year in searching for it. He wants to patent in a group, but can only patent two because he cannot show valuable mineral on the rest. Seven years pass;

he has found no mineral, but is still searching. It is now proposed to compel him to make entry in seven years. If he must first find mineral he will lose his ground and see his two productive claims isolated and perhaps stranded high on a ridge crest.

Take a real case: Tom Higgins owned much of the outlying ground that the Calumet and Arizona took over in Bisbee. There was no ore on the surface and none was found for several hundred feet below. He was poor but held on and finally after more than 10 years he sold to Mr. Cole for much money. He is a Los Angeles millionaire to-day. Under the proposal to make him find ore within seven years he would now be Tom Higgins, shift boss or foreman, with only his pay. All his faith and courage would have availed him nothing.

No, I am most emphatically in favor of granting a patent to the man who performs his work in good faith, whether he has found mineral or not. Otherwise a camp like Bisbee would be a checkerboard of patented and unpatented claims. It would make a practical dead letter of the permission to concentrate development or assessment work on a single claim for the benefit of a group, unless the original discovery work was an actual discovery.

It costs more to acquire public land under the mineral act than in any other way. For a full claim the cost now is about $40 per acre, including work. Some fractions in Bisbee have cost at the rate of $7,000 per acre to patent.

If you divorce surface and mineral rights, you get rid of the town-site locator, timber grabber, etc.

I suggest: "Actual discovery of a valuable mineral deposit shall not be necessary to the valid location of a claim, nor shall the failure to find such deposit within seven years, or less if patent be desired sooner, prevent the owner from making final entry thereon, providing he has fulfilled in good faith the requirements of the law regarding assessment work, etc." This is very important and I am glad that another member raised the question.

I am in favor of the 10-acre claim, square in form, conforming with subdivisions of sections on surveyed land and having N-S and E-W lines on unsurveyed. The smaller the unit claim is the easier it is to locate just the ground one wants. I like the hectare.

There ought to be some limit to the number of claims locatable by one man, but where would you draw it? A limit fair to Oatman might be disastrous in Miami, Bisbee or Grass Valley. I am against a specific numerical limit, but in favor of producing a limiting effect by rigorously enforcing all laws about assessment work, monumenting, recording, etc.

Existing regulations about monumenting should be stricter. All monuments should be as permanent as a Mexican *mojonera* and should be plainly marked and recognizable from the description on record in the recorder's office, and in the local Land Office. It will do little good to prescribe Land Office records if the ground cannot be identified from them.

Notice should be recorded within 90 days as now, but failure to do so should forfeit the ground. That is ample time in the main territory of the United States. I do not know about Alaska. Every prospector knows where to find the county recorder; he knows less of the Land Office. I presume the recording of identical data in the two places is to be specified. Why not let the recorder forward a certified copy of the location notice to the Land Office as soon as the record is made? He could collect the Land Office fee also. This would save the simple-minded some bewilderment.

I am strongly in favor of permitting the concentration of assessment work in one claim of a group, of crediting excess work in one year to a subsequent year and of permitting an equivalent sum to be paid into the Land Office in lieu of work.

Holders of claims doing assessment work should be required to file an affidavit of labor with vouchers. When a man does his own work, it is up to his conscience to say what is a day's work so there should be a minimum footage prescribed for blasting and for picking ground, since it is a common trick to do annual labor in soft talus and gulch wash.

The main lines of patent procedure may as well remain as now. But how about the advertising of the application? At present the claimant is required to advertise for 60 days at his own expense for some one to dispute his title. If the law be rigidly enforced to procure clear monumenting and recording in the Land Office as requisite to a clear title, the mineral surveyor could be supplied with records of unpatented claims by that office as he is with maps of patented ones by the Surveyor General's office. Lack of records of conflicting locations should be taken as prima facie evidence that none exist that are valid. Under such conditions would it be necessary to retain the provision for advertising? If it is retained, need it be for 60 days? Improvements for a 10-acre claim would be $250 instead of $500.

E. The suggestions that the mineral rights should not pass except under laws relating to mines and minerals and no other form of patent shall convey valuable minerals, with certain exceptions, appeals to me as wise. Perhaps provisions and regulations, with regard to the right of a prospector to go on land owned by others, should be included.

I fear that a requirement that the claims shall conform to

the legal sub-divisions on surveyed land would prove to be a hardship in many cases, involving considerable added expense and frequently involving distinctly added uncertainty. The Imperial Valley in California was surveyed many years ago. It was an open, treeless, shrubless plain over much of its extent. When settlement started there it was found extremely difficult to locate the section corners. A second survey was made, incompletely covering the district and the entrymen tried to use one survey or the other, often not knowing what they were using. Endless complications followed and the Government in the end surveyed tracts located by the different people and gave them lot or tract numbers and abandoned the attempt of using sections or parts thereof. I know a case where a man was farming a tract of land and all the records would indicate that the land he owned was located a mile or two away. Eventually these things were straightened out with reasonable justice to the people interested but the process was long and tedious and expensive for the settlers and the Government.

Much of the mineral land of the United States is unsurveyed and where it is surveyed it would be frequently the work of days for a surveyor acquainted with the country to locate a properly established corner and occasionally the nearest corner would be found several miles away. The old surveys were not accurately done always and later on some other surveyor might find another corner in another direction. Surveying from a particular tract to one of these corners might indicate that the ground desired should be described in one way, while surveying from the other corner might indicate it should be described in another way. The moving of a man's ground a few hundred feet might be vital. As a whole my opinion is that the use of the legal sub-divisions on surveyed land would prove unsatisfactory. If the use of legal sub-divisions is abandoned it seems that there should be no provision requiring that the boundaries of claims run north and south and east and west. As to the size of the claims, I would prefer 1,320 or 1,500 ft. square.

I would not limit the number of claims that any individual could locate but I think added effort should be made to enforce assessment work being done yearly.

Mr. E. D. Gardner has some good arguments why mineral discovery should be made prior to location. Would it not be practicable to insist that in case mineral discovery was not made prior to location that work should be prosecuted continuously on the claims, or on a group, until discovery is made?

F. The requirement in our present laws of the antecedent discovery has been one of the greatest sources of abuse. The fact that it has generally been abandoned by common consent is

the best reason why now it should be abandoned legally. It will be well enough to require it still on land not classified as mineral, but let the Land Office see to it that a real discovery is made. I think there should further be a prospecting right. Suppose a man had reason to believe that he might find ore in depth in some classified Government land, and desired to drill for it. He should be given the right to do so and should be protected in the meanwhile.

On land classified as mineral claims should be locatable without discovery. Require the annual assessment work to be honestly performed and duly recorded, making delinquency in this matter as much of a cloud on title as is non-payment of taxes on any real estate. This would check land-grabbers, waiting for the unearned increment.

I am strongly in favor of the square 10-acre claim, conforming to public land survey lines, if possible, but with north and south lines anyway. The small claim is most elastic. It enables a man to take up a small piece of land if that is all he needs. If he needs more all he has to do is to locate more tens. What is the difference between locating four tens and one forty? If it be merely the trouble of monumenting, etc., let it be provided that when anybody locates four 10-acre claims in a 40-acre square he need mark only the exterior corners and lines of the group.

As to north and south lines, the purpose is manifestly to do away (in new districts) with the criss-cross patch-work of a present mining-camp claim map. If somebody had to locate on a vein striking N.W.-S.E. he would simply set his north and south square claims in steps. There might be some waste corners, but with 10-acre claims this would not be a serious matter. It is one of the advantages of the small claim.

COMMUNICATIONS.

REVISION OF MINING LAW.

These communications comprise several from non-members, but it has been understood from the beginning that intelligent contributions on this matter from everybody were invited and welcomed and they are gladly printed in these proceedings.

J. Parke Channing (Sept. 15, 1916).—In regard to the size of the claim, my opinion is that it should be 40 acres, that is, 1320 ft. by 1320 ft. In this way we more nearly preserve the present length of lode allowed in the present mining claim of 1500 ft. and we simply give it extra width to allow for the abolition of the extralateral right. Iron ore leases in Michigan, Minnesota, and Wisconsin are seldom, if ever, made on less than 40-acre tract, unless there should be a fractional 1/16 section

which is not up to the full 40-acres. I am of the opinion that where a country has been sectionized, that undoubtedly these claims should correspond with the 40-acre tracts of the sections. In unsurveyed territory I am doubtful as to whether the provision should be made that lines be north-south and east-west. In cases of veins striking northeast and southwest this would lead to a great deal of confusion.

In this connection it is interesting to note that when the eastern end of Tennessee was sectionized it was apparently recognized that the trend of the country was northeast and southwest and the meridian was made to conform with the general topography of ridges and valleys of the country. Incidentally this very nearly agreed with the trend of the copper formation. I think undoubtedly the first locators in a district would approximately determine the trend of the mineralization and in districts where the formation curved, later claims would be properly oriented.

This rule of square location should, however, not be made too rigid but provision should be made that in a location only two of the angles need be right angles, thus permitting a want of parallelism on one side so that the claim might butt up against another and yet change its general direction to conform to the strike of the lode. I was lately looking over some claim maps of Cuba, in which country I understand all of the angles must be right angles. The result was that in butting up against an adjoining property the line looked like that of a saw, which of course is ridiculous.

I very much favor the principle of permitting an amount equal to the assessment work to be paid in cash, rather than, as is often the case, allowing it to be frittered away without benefit to anyone.

Charles A. Chase (Sept. 14, 1916).—I have reviewed the proposed outline of a mining law as offered by the New York Section, together with the subsequent discussions, and my conclusions are:

1. The classification of public lands seems unimportant, it being well enough to permit the prospector to seek mineral where he will. Mr. Parker's discussion on this is pertinent.

2. To require a claim of 40 acres seems less satisfactory than to make that a maximum for one claim, leaving 10 acres as a permissible minimum; and instead of requiring a large square, permit as many as four 10-acre square units to be placed in a row, thus giving considerable latitude in shape and size of claim. Having this latitude, conformity with legal sub-divisions would be less objectionable, and even attractive in the surveyed areas; further, in unsurveyed areas the exclusive use of north and south and east and west lines would facilitate subsequent reconcilement

with the public survey on the occasion of the official survey for patent. I think it well worth while and practicable to avoid the infinite criss-crossing of claims.

3. Mr. Gardner's discussion shows the necessity of discovery at least antecedent to patent, if not to valid location. Permitting later discovery of mineral coupled with the requirement of full $100 worth of work each year beginning with initiation of claim, compulsory recording of each year's assessment, and heavy penalties for fraudulent affidavits might form a satisfactory procedure. The demand for record in the U. S. Land Office seems impracticable, these offices being in general too remote; such a record without the prior requirement of official survey (even in surveyed areas corroboration as to location is necessary) would be valueless, and worse; being dangerous in attempting to give something that it could not give without better machinery than has been suggested. Most locations originate through individual special knowledge of vacant ground, and that knowledge may be expected to be more accurate than a Land Office map based on inaccurate data.

4. If the claim may be varied from 10 acres to 40, $100 is a reasonable average annual assessment. An actual cash payment 50 per cent. larger in lieu of work on the ground has much to commend it and, if this might be divided between county and national governments, might be acceptable to the Western public.

The crediting of large expenditures in one year to subsequent years seems fundamentally bad.

6. I see no sufficient reason for limiting possessory ownership by requiring patent. If the affidavit of annual labor is made compulsory the possessory title permits simpler return to the public domain.

In general, there seems no sufficient reason why any patent, whether placer or lode, should not be secure from attack after a few years; and be expressly made so in a new general law.

Court review of Land Office decisions should be made readily available.

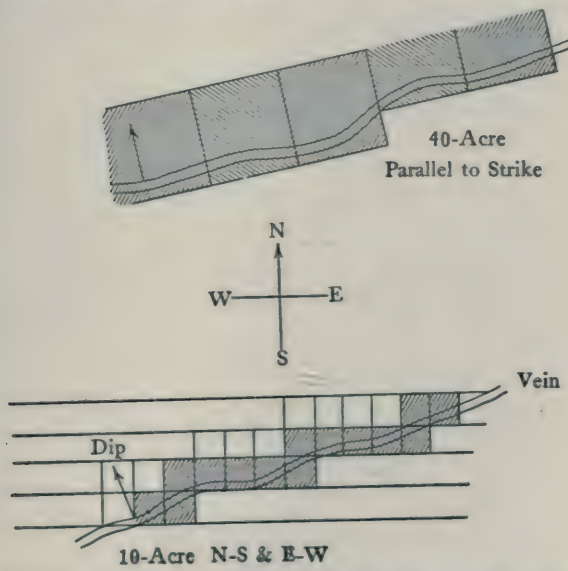
In making these comments I have pre-supposed vertical boundaries subject only to existing extralateral rights. Previously offered current contributions have been useful to me in clarifying my own ideas.

Frank A. Ross[1] (Sept. 4, 1916).—Actual discovery of a valuable mineral deposit should be necessary to a *final* and *valid* location of a claim, but the new law should authorize preliminary locations *without* discovery and should protect the *prior* locator in his rights as long as he prosecutes a *continuous and diligent*

[1] Non-member.

search for mineral. This is to prevent trouble between two or more locators on suspected ground, each striving to find mineral first. But all preliminary rights should determine upon cessation of work and title should revert to the Government.

It is a moot question whether claims should be 660 ft. square or 1320 ft. On surveyed land and in rare cases where veins strike due north-south or east-west the 10-acre claims would offer certain advantages, perhaps, but on unsurveyed lands and where the veins strike in any other directions than N.-S. and E.-W. it would be very difficult to locate them by staggered 10-acre claims, bounded by N.-S. and E.-W. lines, so as to cover enough of the vein on its dip to make the claim valuable. Other



10-acre claims would need to be located in the direction of the dip to protect the first location. See accompanying sketch.

On the other hand, if 1320 ft. square were adopted and the claim might be staked out with one side parallel to the strike (where there is an outcrop) and as close thereto as possible, then the rest of the claim on the dip side would give ownership to a satisfactory depth of vein even without supplementary locations in direction of the dip.

Consequently, I am strongly inclined to believe that claims 1320 ft. square located according to the judgment of the locator and not confined to political divisions and sub-divisions of surveyed lands or to north and south, east and west lines on unsur-

veyed lands, will work better in practice and give more satisfaction all around, regardless of the crazy-quilt pattern of the camp map.

Very few surveys of our mountainous districts are found to be correct, so that fractions are almost bound to exist in any event and must be covered. Again, on unsurveyed lands it would certainly bother any prospector to set out north-south or east-west lines that would hold on survey and he would find such a requirement very obnoxious, I think. The labor of staking claims in heavily timbered districts, for instance, is far greater than most persons imagine and few lines are ever correctly run at first.

Number of claims locatable by one person, or association, should be unlimited, but assessment work or equivalent cash payments should be strictly enforced; failure to comply should work forfeiture of rights, and claims should be so posted or, at least, the records should be so marked as to serve as notice to the public. Present regulations as to marking notices and records of location should be amplified so as to enable the public to trace immediately the ownership of any ground that has been staked. For instance, present monuments are not sufficiently permanent and the same applies to the posted notices of location. Serial numbers should be given to each claim by the Recorder, one series for preliminary notices of location and another for permanent; and these numbers should be carved or painted upon the monuments together with office in which recorded. Preliminary notices should be filed within 30 days—the sooner, the better.

If it is desirable to file any notice in the local U. S. Land Office, then six months after striking valuable deposits should be sufficient. But all notices should be filed at the county seat.

Annual assessment work should be at the rate of $5 per acre, but the payment of an equivalent amount of cash should be permitted in lieu of actual work for a period not to exceed two consecutive years upon a sworn statement of good faith and intention to perform the actual work in future. This would serve to tide over a short period of hard luck but would prevent the holding of claims unworked and undeveloped. Actual work should be required under heavy penalty. Affidavits of same should be made and filed with the recorder annually. Failure to do so should work forfeit within a certain time, say 60 days after Nov. 1st; in other words, before Jan. 1 of each year. Recorder should keep a proper record of each claim filed, showing assessments or lapses, etc. "Recorder" means "County Recorder."

Owners should be permitted (by all means) to hold a group by doing work on one claim provided that this work is development for the group and provided that the total expense of this

work is equal to the number of acres in the said group multiplied by $5, all labor to be reckoned at current wages of the district. Sums expended in excess of the required amount for either single claims or groups should be credited upon the work of the following year or years and should be allowed in applications for patent, provided that no fractions of $200 be allowed if claims comprise 40 acres.

Filing in a U. S. Land Office is not necessary as regards preliminary or final notices of location though there would be no objection to filing the latter if desirable, for any reason. Present patent procedure seems to be reasonably satisfactory on the whole with the exception of scrutiny by land-office officials that are not conversant with mining methods and requirements. U. S. Mineral Surveyors have some improvements to suggest, I believe.

I see no objection to the 7-year limit for the reason that valuable claims are certain to be patented before that time.

By all means, provide for appeal from the decisions of the General Land Office.

L. K. Armstrong[1] (Sept. 7, 1916).—Referring to amount of labor to be expended annually I am opposed to $200 requirement, as unpatented claims are usually in hands of poor people and in withdrawal of extralateral rights the 40-acre claim as a rule will carry no more vein value than 20 acres without abridgment of these rights.

Referring to notice of location and compulsory final entry, I am opposed to limited time for final entry and payment for land with penalty of forfeiture, for this would work a hardship on the claim owner, patented land is a deterrent to development and so the making of mines, and will sooner result in consolidation of large interests.

It is my observation, applied in many cases here,[1] that land once patented is land idle. It is palpably unfair to ask that mineral lands be continuously developed after patent issues, without questioning the legality of such demand. It would seem to be wise to let this provision of the law stand, demand continuous annual assessment, as now, until patent issues without limiting time for this.

Frank A. Ross (Sept. 18, 1916).—I fully agree that, theoretically at least, mining locations made in conformity with meridional lines might somewhat simplify descriptions in certain instances; but I am equally convinced that the net practical result of such a requirement would be to increase greatly the difficulties of location and, quite probably, to create more or less con-

[1]Spokane, Wash. (Non-member).

fusion; again, much more ground would need to be covered than if locations were made parallel to the known, or supposed, strike of veins. I shall briefly outline my objections all of which are based upon practical experience with conditions as they are and not as they are supposed to be by some of our lawmakers. And I wish to preface my remarks with a declaration that staking claims is not the simple process that many imagine it to be. Out in the open, rolling country—yes; but in all mountainous regions, broken up, heavily timbered and brushed and mostly precipitous the work of running claim lines is nearly always severe. Professional men know this but few laymen do. Therefore, my objections to the meridional system are these:

In the first place, immense areas of mineral-bearing ground are still unsurveyed and will so remain, perhaps, indefinitely.

Second, a surprisingly large percentage of completed surveys are what is known as "office surveys," that is, surveys by contract in which the Government has been outrageously cheated by the contractors. For instance, I once employed a surveyor to plat a group of claims in the Cascades, in a district that had been surveyed. Imagine my amazement when he told me as a great joke (!) on himself that, not being able to find the section corners, he had bought one of his own maps, made some years before and forgotten until then because, as he said, "I didn't remember that that district was among those that came under my contract. Why! I never left my office when I made that survey!" Good joke, was it not? I have since been informed that such instances were by no means rare.

Third, in an astonishing number of cases where surveys have been run, no permanent monuments were erected and it becomes a heartbreaking task to locate corners in any instance, but particularly in badly broken, timbered and heavily brushed districts; and prospectors, when about to locate, are quite shy about calling outsiders into a consultation.

I was examining a property a few weeks ago and had occasion to trace certain section corners in the Bitter Roots, Montana. It took me and my assistant two whole days to find two corners. They were marked by flat stones, lying loosely on timbered talus slopes and chiseled so faintly that only through pure luck did my agile assistant tumble on to them.

How on earth can one expect prospectors—strangers to the district, perhaps—to conform to meridional lines, or even to approximate them, nnder circumstances like these? And how many prospectors would do so? They can all strike bee-lines in any directions they may wish to go, but few carry compasses or know how to use them in coursing.

Fourth, when mineral is discovered it is of vital importance

to stake the ground in the shortest possible time. If the discoverer is permitted to take the formation as his guide—down gulches or canyons and up again, through timber, brush and fallen rock—his work of locating is as easy as it can be made for him; but if he must first orient himself, or hunt for section corners, then—I seriously doubt if he will do it; or, if he does, he will everlastingly "cuss-out" the Government that made such fool laws. Furthermore, if it happens that other men are frantically staking all around him, I can see several different kinds of confusion, disputes and even war-like acts, both before and after meridional surveys are made, particularly in an unsurveyed district. Beyond all doubt, many would lose valuable portions of their veins where the strikes of the latter were in directions other than toward the four cardinal points. But this could not happen if claims were staked parallel to the strike and if the monuments of the first line run indicated on which side the remainder of the claim was to lie.

Fifth, I claim that *if vertical planes limit ownership* then there is positively no objection to the so-called "criss-cross" locations. Permanent mineral monuments are easily established to which all claim corners may be tied; and these monuments themselves may be tied to section corners if anything is to be gained thereby, as in the making of a general map et cetera. No confusion ever has arisen that could not also arise under the meridional system. In every stampede, claim lines always overlap each other and always will. Adjustments must follow and there is no practical remedy for this condition.

The crux of the whole matter, to my mind, is the enforced establishment of permanent corner-monuments together with a destruction of all obsolete monuments by the official mineral surveyor after he has noted their exact locations in his records.

To-day our mining regions bristle with decrepit corner posts on lapsed claims that merely serve to libel the ground or to act as bases of blackmail suits.

Whether or not the claims comprise 10 or 40 acres is, I think, immaterial although the suggestion to stake only a 40 where four claims are taken up is to the point as a compromise.

RESPECTING APPLICATIONS FOR MEMBERSHIP.

Howland Bancroft (July 13, 1916).—At present the final action of the Council in regard to applications for membership in the Society is stated to be taken one month from the date of sending out the lists.

May I suggest that in my opinion this final action should not be taken until after such a time shall have elapsed as will

enable members temporarily absent from the United States to comply as requested, namely, "to transmit to the Executive Committee, * * * * * any information bearing upon the suitability of any candidates named herein (the lists) for admission to the Society."

For example: List No. 62, dated June 1st, 1916, reached me to-day, or some 12 days after final action has been taken regarding the application of the candidates whose qualifications are therein briefly set forth.

The Mining and Metallurgical Society of America has the reputation (even in this part of the world)[1] as the *one* really representative professional organization of the better class of technical mining men in the United States of America, and its proceedings are really taken seriously. Therefore, I think it can ill afford to run the slightest risk of jeopardizing its future field of usefulness and influence by a possible too hasty acceptance and consideration of applications for admission to membership.

MEETINGS OF SECTIONS.

NEW YORK.

Meeting of May 20, 1916.

The following lecture was the principal feature at the meeting of May 20, but it has not been possible until now to prepare it for publication. Readers will please recall that the lecture was presented very informally, that it was profusely illustrated by lantern slides which it is not feasible to reproduce, and that the following report is based upon stenographer's notes.

Mining the Frozen Gravels of Siberia and the Yukon.

H. M. Payne.—From Seattle and Vancouver, the inside passage to Skagway leads through an endless panorama of the most beautiful coloring. This passage includes Queen Charlotte Sound, Dixon's Entrance, the Whale Channel, Seymour and Wrangell Narrows, the Gastineau Channel, and various other passages, well charted and marked by light houses and buoys as far as the Canadian waters extend; but beyond Prince Rupert, the great terminal of the Grand Trunk Pacific Railroad, we come to the American waters, Cape Fox marking the southern point of Alaska, and from there on very little has been done to mark a safe passageway. For the rest of the journey one is more or less in danger of icebergs and uncharted rocks; many steamers have been lost there in the past 20 years.

Here we have the Main Street of Douglas, Alaska. When

[1] Mr. Bancroft wrote from Vina del Mar, Chile.

the long days come on in the summer and the snow begins to melt (there is always plenty of frost in the ground) the bog with which the entire north country is covered begins to thaw, and at every step our feet go through to frost. Hence, we have the term "Mushing over the trail," and so we say to the dogs in the Northland, "Mush on!" The houses are built on stilts and the streets must be planked like a walk. As there are no wagon roads out through the country, it is only necessary to have a street, where the dog teams can go and the people can walk.

Near Douglas are the famous Treadwell mines, and across the Gastineau Channel is Juneau, the capital, at the foot of a 3000-ft. mountain. Just before we get to Skagway we pass the famous Taku glacier, a mile wide at its mouth, the largest of 45 similar glaciers, and here we see icebergs floating in the sea, where they have broken off from the lower end of this ever-flowing river of ice. These do not look like very great menaces to navigation, but when you recall that there is 10 times as much ice below water as there is above you can realize what a great danger they really are.

After we pass Skagway, in the foreground you can see what looks like a railroad grade. This is the old trail leading through the White Pass, famous in '96 and '97, the days of the Klondike stampede. No longer does man or beast pass over the trail; instead, a train climbs the grade, passes around Inspiration Point, here and there held to the cliff by a concrete wall or passing over a spiderlike trestle high in the air. They charge 22c. per mile over the White Pass, so that these 114 miles cost more than to go from New York to Chicago. Before the railroad was extended to White Horse, all passengers and freight had to go through Miles Cañon on barges crudely built of timber. An enterprising whisky dealer painted an advertisement on the Cañon walls at the upper end reading "Drink ————'s whisky." Many barges were wrecked that year in the Cañon, and some wag painted on one of the wrecks, "I did."

Here we find the dog teams and the dog sled. You may disabuse your minds of any glamour as to traveling on a sled with a dog team. You have doubtless pictured yourself well wrapped in warm furs, going over the trail with the dogs, but, as a matter of fact, if you made 25 or 30 miles a day with your dog team, it means that you have walked and run 25 or 30 miles a day, holding on to the handles like those on a plow or cultivator, to keep the sled from upsetting, pushing when going uphill and holding back when going downhill, and always hollering at the dogs to keep them in the trail. One dog alone cannot draw 100 lb. but with a string of four or five dogs a load averaging 100 lb. per dog can be taken if the trail is in good condition. The great bulk

of the load is dog feed, dried salmon. The Indians catch the fish and dry it in the summer, then roll it up in bundles and use it for dog food in the winter. The Indians and Esquimaux also eat this food; white men do also, to keep from starving to death, but not from choice.

It becomes impossible in the spring of the year, when the breakup of the ice occurs, to cross some of the streams with a heavy load; hence, especially in Siberia, heavy mining machinery must be taken in during the winter, over the ice, and in order to prolong the trail as late as possible, we fix it by laying poles and brush, covering them with moss, and pouring water over it. At night, it freezes so that in the early morning following we have a sort of reinforced ice to ride over. In that way the trail is kept open a couple of weeks later in the Spring than would otherwise be possible.

This country, as you know, has six months' day and six months' night—it is the "Land of the Midnight Sun." This does not mean, literally, that the sun sets and rises for six months each, but within the Arctic Circle the sun does not set in the middle of summer and does not rise in the middle of winter. At Dawson, only a short distance below the Arctic Circle, the sun does actually set during June, but only for a short time, and from the mountain back of Dawson, known as the Dome, the midnight sun may be seen. Thus, for four months in the summer it is continuously light and for four months in the winter continuously dark, while during the intervening periods the change is rapid from extreme light to extreme darkness.

The season being short in that district, and gold mining being the only industry, it is essential that everything should be done to facilitate operations during the summer months. The entire gravel of the Arctic is frozen by prehistoric frost. We know that, from the geological standpoint, it could not have been frozen when the gold was deposited there, nor when the lignites were formed, but drillholes in several places to a depth of 250 ft. have found the frost absolutely unbroken. How much deeper it extends we do not know, but the gravel must be thawed before the gold can be removed.

Great glaciers form the tributaries of the Klondike, where the streams freeze solid to the bottom, with the exception of their swiftest, deepest channels.

This view was taken on Hunker Creek, a gold-bearing tributary of the Klondike, and we shall now see the various methods by which gold is extracted. This view, which shows the speaker in the crevasse, will give you a better conception of the thickness of the glacier, extending as it does far above my head.

This ice must be removed before the ground can be thawed, so we drill holes in it in the ordinary way, and break up the ice for a considerable distance by dynamiting. After the broken ice has been floated down the river, thawing points are driven into the ground at intervals of 8 to 16 ft. These are connected by rubber hose to a steam or hot-water line, and the ground is thus thawed, sometimes as deep as 50 ft., down to bed rock.

Then the gold dredges come along and remove the gravel, wash out the gold, and carry the stones and boulders back to the tailing piles. During the open season, a number of these dredges go back and forth, up and down the streams. Some dredges have buckets of 17 cu. ft. capacity, the weight of the tumblers or sprockets being from 20 to 28 tons each. Each bucket weighs 1200 lb., the lip is 2½ in. thick, and the entire bucket is made of manganese steel.

These dredges consume from 0.75 to 1.50 k.w. per cu. yd. dug, and have a capacity of 18,000 cu. yd. per 24 hr. Inside the dredge is an enormous trommel, 50 ft. long and 9½ ft. inside diameter, revolving rapidly, into the upper end of which all the gravel is dumped. To facilitate the separation, a powerful stream of 15,000 gal. of water per minute is pumped into the screen, which contains about 50 tons of material at one time. It costs about $2 for every minute one of these dredges is shut down; therefore, when any important part is broken they never stop to repair it but immediately put in a new part.

You are all familiar with those 50-ton steel coke cars operated by the railroads. The yardage handled by one of these dredges in 24 hr. will more than fill 100 such cars, and, out of it all, perhaps one teacupful of gold will be washed. This gives some conception of the enormous quantity handled by one of these dredges, and shows how impossible it is for an individual to make money under such conditions. The cost of a dredge erected in the Klondike is about $700,000, while in Siberia one will cost $1,250,000, erected.

Overlying the gold-bearing gravel is an overburden of black muck or peat-like bog, which is hard to thaw and, on account of the roots it contains, clogs the screens. As it contains no gold, it adds materially to the yardage to be handled through the dredge, unless it can be otherwise removed. Wherever possible, this is done by impounding the water of a small stream behind an automatic dam and then letting it rush at intervals, with great volume and force, thus carrying away large quantities of this overburden. A small gate is built in the face of the dam, sliding up and down like a window frame, and partly counterbalanced by an empty oil barrel, having a small hole in the bottom. At the top of the dam, slightly depressed, is a sluice leading

to the barrel. When the dam is full, the water overflows into the barrel faster than it can run out of the small hole in the bottom. When the barrel is full, its weight is greater than the resistance of the gate, which then opens and the water does a few minutes of very effective ground sluicing. In the meantime, as no more water enters the barrel, it soon leaks empty, and the weight of the gate being greater than that of the empty barrel, the dam again closes. By utilizing the current of the Klondike River itself last year 1,250,000 cu. yd. were thus carried away.

Another method of mining the gold is to drive entries into the frozen gravel just as in the room-and-pillar method of coal mining. One mine is 40 ft. below the bed of the Klondike River. The roof is frozen gravel and supports the river just as safely as though it were reinforced concrete. The big boulders are removed and gobbed along the sides while the fine gravel is taken to the surface and washed.

Still another way of getting gold is by hydraulic or placer mining. Water comes out of the monitors under a pressure of about 200 lb. per sq. in. The riffles consist of wood blocks about 1 ft. long, set slightly tilted, so as to present an edge like paving blocks on a steep hill. At the end of the season, when the final cleanup takes place, these blocks are taken up and burned, to save the gold that has been pounded into them.

When I first visited the Klondike, no extensive study had been made of the temperatures of the frozen gravels, or of the duty of a given volume and velocity of water in ground sluicing frozen muck, nor had the possibilities of hot-water thawing been seriously considered.

The local annual frost averages 6.5 ft. The thaw, under undisturbed conditions, rarely exceeds 1.5 ft. In open-cutting, the thaw in the middle of summer may reach 1 ft. per day if the muck is removed. The nature of the adjacent hills also affects the rate of thawing. If the sides of the valley are rocky, they retain the heat; if they are moss covered, the sun has little effect.

Where ground sluicing is practiced on the creeks, the average specific gravity of solids carried has been found to be 2.55, and the amount carried in suspension was 2.41 per cent. by volume or 6.2 per cent. by weight.

The result of a series of temperature measurements made by the speaker, covering 27 tests, gave bed-rock temperatures ranging from 2° to 14°, average 9°F. Gravel varied from 17° to 22°, average 19° F. Black muck, 17° to 24°, average 20° F. Sandy muck, 19° to 24°, average 21° F. The average ice content was 46 per cent. It was also found that below frost line the temperature drops, within the next few inches, to the mean tempera-

ture of the mass, depending solely on the nature of the material and not on its depth, nor on water level.

Forty-six separate samples were taken to determine the specific gravities frozen and thawed, the specific heats, the percentages of ice and solids, both by weight and volume, etc., so that the necessary B.t.u. to raise 1 cu. ft. of frozen material to 32°F. was easily ascertained.

In 1912 the steam thawing points were driven in rectangles 8 to 10 ft. apart. The first change introduced was to drive these in triangles, thus reducing the theoretical unthawed segment between the thawed cylinders of ground, or the corresponding necessary overlap to thaw the area completely. When the hot-water thawing experiments were being carried on, the points were driven at varying distances and depths, allowed to stand for various periods, and then withdrawn, and excavations were made to ascertain their efficiency.

It was conclusively proved that the distance between thawing points could be materially increased when hot water was used, and that there was an acceleration of thawing activity as the diameter of the cylinder to be thawed was increased. In regular steam thawing, the points spaced in 8-ft. rectangles or 9.5-ft. triangles were left for 72 hr. The intervening segments of overlying muck were then sweated for 24 hr. more. Total, 96 hr. for each 8 or 9.5 ft. cylinder. After preliminary tests with hot water, the points were spaced twice the regular distance apart, thus having four times the volume to thaw, and it was naturally inferred that 16 days, instead of 4, would be required. At the end of 11½ days, however, the thawing was found to be completely and thoroughly accomplished. In addition to the time gained, there is a direct saving in fuel, and a 75 per cent. saving in labor for driving and pulling points. The quantity of water required is 3.6 times as much as for steam at the same pressure, the boilers being supplied by injectors and the pipe line being connected with the blow-off pipe. Three-way connections were used instead of the two-way sets, thus reducing the amount of pipe to be laid and maintained, and the amount of walking required to attend the points while thawing is in progress.

An ordinary Ingersoll-Rand rock-drill point was substituted on the end of the ¾-in. pipe for the old steam thawing point, and a 3/32-in. hole was drilled in each of the flutes, about 2½ in. from the end. These four holes, with the fifth in the center of the bottom, avoided all difficulty from clogging and enabled the operator to cut through rocks and boulders either in creek bed or tailing piles, thus driving the thawing point immediately to bed rock and thawing from the bottom up, rather than inversely, as had been necessary with the former method and equipment.

Standard time periods were ascertained for thawing any given material at any depth, so that the whole process of thawing is now reduced to a scientific basis.

Anvils weighing about 100 lb. were forged from old dredge bucket pins, slotted to pass over the thawing point, and keyed in place by a steel key with Morris taper. Handles were inserted in each side for use as "twisters." The operator stands on the ground and drives the point until the anvil is down to the ground; then the key is knocked out, the "twister" raises the anvil to convenient height, the key is inserted, and the operation repeated until bed rock is reached. By the use of these anvils, ladders were eliminated in driving, not one point was broken during a season's work, and the driving time was materially reduced.

Some idea of the advantages of the hot-water method may be gained when I state that during the season of 1915 we increased the amount thawed per point 265 per cent.; decreased the driving time 50 per cent.; decreased the thawing period 50 per cent.; decreased the fuel consumption per unit thawed 65 per cent.; decreased the number of points necessary per unit area 70 per cent.; decreased the piping and trestling used 48 per cent.; and eliminated rubber hose entirely, except for driving.

Standard pipe connections are put in as soon as the point is at its maximum depth, and ordinary railroad-train hose couplings are inserted between the connecting pipe and supply line, thus obviating the use of nipples or Stilson wrenches, and avoiding many bad accidents from scalding.

As a general rule it may be stated that with hot water as a thawing medium, the point should remain at its maximum depth 4/7 of the total predetermined thawing period. It should then be drawn and another point 2/3 as long inserted, and left for 2/7 of the thawing period. If there is no muck, and the frost line is 8 ft. or more below the surface, it is probable that this will suffice; otherwise, a point 1/3 the length of the original one should be left for the remaining 1/7 of the required total thawing period.

During the past four years, we have developed an acknowledged master-type of dredge, we have reduced thawing to a scientific basis and have eliminated many wastes in equipment and operation previously ignored.

It is interesting to note in this connection that with these big dredges we have reverted to the days of Agricola and the legend of the Golden Fleece. Instead of using quicksilver on the tables, we use cocoanut-fibre mats and expanded-metal riffles. The gold is washed out of the mats, the magnetic black sand is taken out with a magnet, the lead shot and similar metal removed by picking, and the gold is then melted into bars. Less than 100 lb. of quicksilver per year is consumed, and this is used to

remove the flour gold from the black sand and blowings, after being ground in a muller.

The use or non-use of quicksilver on these dredges is a much discussed question among various operators. It is my personal opinion that on the smaller 7½-cu. ft. dredges it may be necessary, due to the shorter screens and lesser number of tables, but I am satisfied that on these larger dredges, with their gigantic screens and many tables, and nugget-catchers below, no appreciable gold goes over the stacker. The amount of lead which we recover from shot, in the Klondike Valley, is amazing. A comparison of the assay reports shows that gold recovered by quicksilver runs higher in lead than that which is washed and blown, so this also is a commercial inducement in favor of the fibre mats.

With a view to attaining the highest combined efficiency and productivity graphic recording meters are attached to every separate motor on these dredges, and every effort is made to eliminate unnecessary shut-downs. During the summer of 1915, an actual running time of 23 hr. 37 min. was established, out of a possible 24 hr. The secret of the success of the dredges, however, is no more in their design than in the organization and personnel by which they are operated.

Having eliminated space in a few brief moments, having arranged our passport difficulties at Vladivostok, and having traveled for several days over the Trans-Siberian Railway from that narrow neck of Siberia which joins Korea, on across Manchuria and Mongolia, again into Siberia and through the Trans-Baikal provinces, we arrive at Irkutsk.

Probably you have no conception of the enormous distances which one must traverse in crossing Siberia and Russia. The maps which we have are on such a small scale that they convey no adequate impression, and were they to be on a scale comparable to those with which we are familiar—they would be so large as to be unwieldy. I have one from Baedeker, another I bought in New York, and a third I purchased in Petrograd, and if we were to compare these with the maps of Siberia in any of our highest-priced atlases, we would find that the mountains shown in one did not exist in another, that rivers were rising in different parts of the country, and, in general, a very chaotic condition.

When we arrive in a Russian city, we must first present our passports, which are examined by a Russian officer: we are asked all kinds of questions—whether we take part in politics, what are our politics, do we know any people in the city, have they ever been arrested, what is our purpose in visiting the city, where we came from, how long do we intend to stay, where we are going next, etc., etc.? Since the war began, the Trans-Siberian

passenger trains run only once a week; the rest of the time they carry freight and ammunition.

At Irkutsk we see Lake Baikal, which averages 6500 ft. in depth, 56 miles in width, and 400 miles in length, being, in point of volume, one of the largest fresh-water lakes in the world. Irkutsk is the largest city in central Siberia, and there are some very fair convict-built roads leading out into the boundless Steppes of Russia.

Our road leads directly north, and is the road over which have passed thousands of hopeless exiles, into the almost unknown North. After we have gone so far as possible by auto, we find a *telega,* or native Russian wagon. This one belonged to a prosperous merchant, who had sent outside and secured some real wheels. The axles are made of poles, as is also the bed of the wagon, and the center of gravity being very high, when the road is sloping the wagon is easily upset. The horse has a collar but no hames, traces, or whiffletree, and the shafts are rigidly attached to the front axle. Over the horse's neck is a large wooden bow, to which are lashed on each side the collar and the shafts. Speaking in a mechanical sense, the horse is thus an integral part of the wagon, and when the wagon upsets the horse rolls over on his back, and the peasant goes home and tells his wife that the horse is in the ditch and she had better go and get him out.

There is a Russian word, *nitchevo,* which I should say is the most popular word in the language, because it is the inevitable reply whenever a criticism is offered or a suggestion made. This word, being interpreted in colloquial modern American, means "I should worry!" Whenever one does something to displease a Russian, such as causing his horse to run away from fright at an automobile, the Russian first exclaims *nitchevo,* as regards the event, but usually adds the favorite Russian curse, which is "Hope you may die of the cholera." The Siberian peasant never greases the wheels of his wagon, unless it be with a little coal tar, so 500 lb. is about all a pony can draw. I explained to them that a little ordinary grease would help wonderfully, but received the same shrug of the shoulders and *nitchevo.* If you tell a man that he has lost a sack of meal off of his wagon he says *nitchevo,* and sends his wife back to get it.

After we have traveled several hundred miles in this manner, we come to the head of the Lena River, which flows into the Arctic. Here you get the *tschittik,* or native row boat. In this case, we wanted some protection, so we bent some poles over the top of the boat and secured a canvas, which we put up as a tent, to protect ourselves from the rain.

You cook, on an open fire in the bow of the boat, such food as you can buy from convict or exile villages as you go down the

river. The principal thing you get in Russia is cabbage—it is the Russian national dish. Soup in Russia is made of cabbage. You get cabbage boiled, fried, roasted, baked, stewed or raw, maybe sweet, maybe sour, but it is always sure to be cabbage. Potatoes, when you get them, are usually soggy, generally frozen and thawed several times, but as you don't get them often it doesn't worry you. In Siberia they have a black rye bread; it is fermented, sour and hard. Cabbage, *kapoosta*, and sour rye bread, *chorni-chlebp*, are the principal articles of diet from the time you enter to the time you leave. Sometimes you get sour cream to put into the inevitable cabbage soup, but they want it real sour. Once in awhile you get eggs, but after one or two experiences we decided to take our chickens in the natural state. The Russians are great tea drinkers.

We spent 15 days and nights going down the Lena River in this *tschittik*, living on this sort of food. Now, as we go 1200 to 1500 miles or more away from the railroad, we get into the further settlements where the exiles, some political, some murderers and some thieves, have been sent in years past.

When you are ready to leave Russia, you must have a written permit, showing that you have committed no crime while there. One must have a passport to go from one town to another. If you wanted to go from here to a town 10 miles away, you would have to go to the *Izprovnik* of police and get a permit from him. If you should be visiting in Russia, and there came up a thunder storm and you wanted to remain all night, it would be necessary first to send over to the police and get a permit. An exile has a special passport and can go only about five miles outside of the village, and his children must live and die within this space. While, of course, conditions are at present very much better than formerly, still the life of the Siberian peasant remains miserably circumscribed.

After this hard trip in a *tschittik*, we eventually reach the head of navigation, where we find a steamer with few first-class cabins. The only difference in the accommodations is that the second-class passenger sits on the floor and lets his feet hang over, while the first-class passengers have a shelf about 2½ ft. wide by 5½ ft. long, on which to sit or sleep. They have a box of sand out front, in which to build a fire and cook the inevitable cabbage.

A gentleman's carriage is called a *droschke*. Every gentleman has at least two horses to his *droschke*, and if he is especially affluent he has three. The middle horse, which does all the pulling, is harnessed to the *droschke* in the same way as to a *telega*, with the bow, collar and shafts lashed together. The outside horse has his head reined around to the outside, purely as a

matter of style, so that he is able to see the road only with one eye; neither second nor third horse can pull at all. The Russians say his purpose is to show his owner's affluence, but I have discovered that the real purpose is to throw mud into your lap.

We now meet the Korean *staratelli,* or itinerant tramp miners, panning out the gold in a crude wooden trough, an imitation of a miner's gold pan. These men work large areas of gold-bearing gravel, not sufficiently rich to pay the company to operate. The miners bring the gravel out from the mine during the winter and deposit it on the winter dumps. Of course, no water is available during the winter, so they help themselves to such nuggets as they can and then, when Spring arrives and water is available for washing the gravel, the dumps are dug up and taken in small carts over to the washing plant, and again the men help themselves to whatever nuggets they can get. This is an inducement to miners to come there, and the Russian law is that the company must buy from the miners any "God-sent" gold. "God-sent" gold really amounts to any gold they can help themselves to. Thus every night is payday, and the miners come out with such nuggets as they have been able to steal and say in effect, "Kind master, here is what I have stolen from you—be kind enough to weigh it and give me what you owe me." In one year the company paid about 3½ million Roubles buying back their own gold. Last year, what was supposed to be the second largest nugget in the world was dug, as large as my forearm, and containing gold worth about 8,000 Roubles or $4,000. The miner who dug this nugget claimed to have found it in the highway, but after being paid for it, as required by law, admitted that he had dug it in his working place. Now it is proposed to stop this by putting in large dredges.

The famous Blagoveschensky cut, up to last year, was the richest goldfield known in the world. From it 1,000,000 cu. yd. were taken, cleaning up about $18,000,000 or $18 to the cubic yard, an average of about $12 per square foot of bed rock. The average value up and down the river is $7.50 per cu. yd. while 37c. cu. yd. is a fair average in the Klondike; yet we are making more money out of 37c. Klondike gravel than they are with the $7.50 Russian gravel, because they are so wasteful. Since the Blagoveschensky, the Feodosievsky has been discovered. This is even richer, the average values in one working place being $546.75 per cu. yd.

To keep civilians and others not employed by the company from entering these rich places, each room is safeguarded by an iron-studded plank door. In addition, a policeman is stationed there to keep the miner from stealing too many nuggets. The result is that if we have 824 workmen we have also 824

policemen; total 1648 expert thieves. The waste of timber, the losses in power, the gross inefficiency, are astounding to the American mining engineer, but in time many of these things will be bettered.

D. H. Browne.—I want to thank Dr. Payne on behalf of myself and the other members present for his most interesting and instructive talk. I move a vote of thanks to Dr. Payne.

(The motion was seconded and unanimously carried).

Mr. Lindgren.—I was much interested in the angular appearance of the gravel in your photograph of the underground workings in Siberia. Is this typical of that field?

Dr. Payne.—That is one striking difference between the Yukon and the Siberian goldfield. The Yukon pebbles are all rounded and the nuggets are the usual type of rounded, more or less elongated form. In Siberia, the gravel is very angular and flat, so much so that it is impossible to hydraulic and flume it because the gravel will not sluice. The nuggets are flattened similarly, and are not at all of the rounded type usually found in the Yukon.

Mr. Copeland.—We find this angular gravel very abundantly in the Seward Peninsula; nevertheless, we have done a great deal of ground sluicing there, with very profitable results.

Mr. Weed.—Is the gravel the same as the bedrock?

Dr. Payne.—Yes, both gravel and bedrock are limestone in almost all cases.

Mr. Copeland.—Do you dig on bedrock or do you dig into it?

Dr. Payne.—In the Klondike we find no gold whatever in the overburden, but as the gold goes down into the bedrock we have to dig about 2 ft. of it to get all of the gold. In Siberia, the gold begins at the very top of the gravel and is irregularly dispersed. One may find the richest portion of one section anywhere in the gravel between the top and the bedrock, and the gold does not extend into the bedrock as it does in the Yukon.

DONALD M. LIDDELL,
Section Secretary

SECTION MEETING, SEPTEMBER 21, 1916.

The annual business meeting and election of officers of the New York Section of the Mining and Metallurgical Society of America was held at the Engineer's Club on Sept. 21, 1916, following an informal dinner at which the following members were present: R. C. Canby, R. W. Deacon, J. V. N. Dorr, A. S. Dwight, H. W. Hardinge, J. E. Johnson, Jr., W. McA. Johnson, E. B. Kirby, D. M. Liddell, Robert Peele, F. R. Pyne, M. B. Spaulding, J. H. Susmann, W. Y. Westervelt and Ralph Williams.

The treasurer of the section rendered the following report:

New York Section, Mining and Metallurgical Society of America.
September 16, 1915—September 21, 1916.

Receipts.

Balance on hand, September 16, 1915	$94.95
Paid by members for dinners	241.50
Assessments paid	84.00
Total of balance and receipts	$420.45

Disbursements.

Dinners	$246.70
Postal cards and printing	25.00
Maps for C. L. Cantley's address	1.95
Christmas gift to Machinery Club employees	10.00
Railroad fare, Du Bois, patent meeting	8.20
Reporting mining-law meeting	12.00
Rental of lantern, Payne address	7.50
Postage	7.51
Clerical labor	1.00
Total expenditures	$319.86
Balance on hand	$100.59

Assets and Liabilities, September 21, 1916.

Cash—as above	$100.59
Due from National Society	4.00
Total Assets	$104.59
Liabilities, prepaid assessments (E. G. Spilsbury)	2.00
Balance of Assets	$102.59

DONALD M. LIDDELL,
Section Secretary.

It was moved by Mr. Susmann that the report be accepted, and because of the small amount involved and the self-evident nature of most of the expenditure that the formality and expense of an audit be dispensed with, which was seconded by Mr. Deacon and unanimously carried.

The secretary read the following report from a committee appointed to consider a proper tribute to give to Mr. Hoover:

The undersigned, members of a committee of three, appointed by the New York Section of the Mining and Metallurgical Society, to recommend an appropriate recognition by the Mining and Metallurgical Society of America of the work of Herbert C. Hoover in relieving the distress of the Belgians during the Great War, beg to report as follows:

We consider that the recognition that would be most appreciated by Mr. Hoover is a testimonial written on parchment and signed by every member of the Mining and Metallurgical Society of America. There would be a great deal of work involved in

this, but it can be done. Medals, loving cups, etc., are relatively easy to give. We think that Mr. Hoover would appreciate more highly something requiring personal effort on the part of every member of the Society.

Mr. Rigg, the other member of this committee, is unable to sign this report owing to his absence in Australia, but before his departure he signified his approval of the recommendation.

Yours truly,

W. R. INGALLS,
S. H. BALL.

It was moved by Mr. Dwight that this report be accepted and that the present committee be requested to draw up the form of such memorial. Seconded by Mr. Dorr and unanimously carried.

The following officers were then elected for the ensuing year: Chairman, W. R. Ingalls; vice-chairman, W. Y. Westervelt; secretary-treasurer, D. M. Liddell.

M. B. Spaulding made the suggestion that the attempt be made during the coming year to appoint various small committees, of three or four members, each committee representing a separate line of work and each on taking up the preparation of the program for one meeting. Referred to the chairman-elect for approval and action.

D. M. LIDDELL,
Section Secretary.

OBITUARY.

GEORGE W. RITER.

George W. Riter, well known in Utah as a mining engineer, died in Salt Lake City, Aug. 20, as the result of an apoplectic stroke. He was born in Salt Lake in 1871, the son of Levi E. Riter, a pioneer of 1847, and Annie Riter. He attended the University of Utah and went from there to Stanford University in 1893, from which institution he was graduated in 1896, with a degree in mining engineering. On returning to Salt Lake, he became connected with the Eureka Hill Mining Co., in Tintic, as secretary and general manager, which position he held until about four years before the time of his death.

Mr. Riter was city engineer for Salt Lake City from 1904 to 1906. Three years ago he went to Washington as the representative of the mine producers of Utah before the Ways and Means Committee of Congress, then engaged in the preparation of the present tariff law. Mr. Riter presented to the committee statistics in regard to the tariff on ores, as affecting the Western States. He was for nine years treasurer and a member of the executive committee of the Tintic Mine Owners' Association. He was elected a member of the Mining and Metallurgical Society of America in 1912.

CHANGE OF ADDRESS.

Dufourcq, E. L. .....Rooms 808-10, 18 Broadway, New York
Hanley, Herbert R. ..920 Newhouse Bldg., Salt Lake City, Utah
Rigg, Gilbert .....Melbourne, Aust.
Broken Hill Associated Smelters Prop. Ltd., Collins House
Yeatman, Pope .....Room 1109, 111 Broadway, New York

PERSONALS.

Lieut. Percy E. Barbour, who has been at McAllen, Texas, attended the recent meeting of the American Institute of Mining Engineers in Arizona, having obtained a leave of absence from his regiment. Mr. Barbour is one of the associate editors of the "Rio Grande Rattler," an interesting newspaper published at the border.

Edwin S. Berry, who has joined Pope Yeatman as a partner, sailed for Peru Sept. 16 in connection with mine examination work in that country.

Frederick Bradshaw, general manager of the Tonopah Belmont Development Co., has been on a visit to the Surf Inlet Mine on Princess Royal Island.

Herbert R. Hanley has been appointed superintendent of the Mammoth Copper Co.'s new electrolytic zinc plant at Kennett, Calif., and is directing its design and construction based on his processes.

Fred Hellmann, general manager of the Chile Copper Co., has been appointed consulting engineer by the firm of Guggenheim Brothers, succeeding Pope Yeatman.

Hennen Jennings is the author of a bulletin just issued by the U. S. Bureau of Mines, entitled "The History and Development of Gold Dredging in Montana."

H. H. Knox is about to sail for England, whence he will go to Siberia on professional work that will occupy him about three months.

M. L. Requa has returned to San Francisco from Alaska.

Prof. Milnor Roberts was in Juneau the latter part of August on his way to examine copper properties in the Copper River region.

Mining and Metallurgical Society *of* America

Vol. IX October 31, 1916 No. 10

ANNOUNCEMENTS.

Delayed Publication.—The publication of this bulletin has been delayed in order to include reports of ballot on the revision of the mining law, and also nominations for officers and councillors for 1917.

New York Section.—The next meeting of the New York Section will be held at the Engineers' Club, on Thursday, November 16.

Ballot on Mining Law Revision.—The vote of the membership on this question was large and representative considering the circumstances. Foreign members did not vote. The Secretary received many letters from metallurgical members saying that they did not vote owing to the lack of knowledge of the subject. On the whole the vote was especially representative of the membership that is directly interested in mining in the public land states.

Tellers.—The President of the Society appointed D. M. Liddell and F. W. Parsons tellers to count the ballots, on Nov. 2.

Medal Committee.—The President of the Society has appointed F. F. Sharpless member of the Medal Committee in place of J. F. Kemp.

NOMINATIONS FOR OFFICERS, 1917.

At the meeting of the Council on Nov. 6, the Secretary reported the nominations received from members of the Society, and the Council directed that the following names be placed on the official ballot in conformity with the by-laws of the Society:

President: W. R. Ingalls; S. W. Mudd; H. V. Winchell.

Vice-President: W. Lindgren.

Secretary-Treasurer: Louis D. Huntoon.

Councillor, District 1, 2, 3, 4: W. H. Aldridge; J. Parke Channing; J. H. Janeway; A. L. Walker.

Councillor, District 6: R. M. Catlin; J. H. Pratt; G. O. Smith.

Councillor, District 7: E. B. Kirby.

Councillor, District 9, 10: E. H. Benjamin; A. Burch; F. H. Probert.

Councillor, District 12: Stanly A. Easton; R. H. Sales.

ACTIONS TOWARD REVISION OF MINING LAW.

The following motions were made by Mr. Ingalls and were seconded by Messrs. Dwight and Stone, councillors, all by written communications to the President on September 20, 1916:—

1. That there be an immediate referendum to members of the Society of questions involved in drafting a new mining law.

2. That the questionnaire be similar in form to what was mailed to members of Council on September 12, 1916.

3. That organizations co-operating in the convention in Washington, in December, 1915, be invited to hold a similar referendum, or obtain an expression of the opinion of their memberships according to the provisions of their by-laws, at the same time that the referendum of the Mining and Metallurgical Society of America is being held.

I request that the above motions be submitted to the members of the Council for letter-ballot in accordance with the provisions of By-law 12 of the Society.

With respect to this motion the President communicated the following to the Secretary:

Messrs. W. R. Ingalls, Arthur S. Dwight and George C. Stone, members of Council, have forwarded me letters in conformity with the terms of Article 12 of the By-laws, requesting that I order a letter ballot to the members of the Council to decide on the question of submitting certain questions appended to the letter of Mr. Ingalls of September 20, 1916.

As this is in proper form I feel it my duty to order that this referendum be made at once.

In accordance with the order of the President, the following ballot was issued to the members of the Council on September 21:

To the Members of the Council of the Mining and Metallurgical Society of America.

A request has been made in writing by three members of the Council that a letter ballot of the Council be held on the following motions:

1. That there be an immediate referendum to members of the Society of questions involved in drafting a new mining law.

2. That the questionnaire be similar in form to what was mailed to members of Council on September 12, 1916.

3. That organizations co-operating in the convention in Washington in December, 1915, be invited to hold a similar referendum, or obtain an expression of the opinion of their memberships according to the provisions of their by-laws, at the same time that the referendum of the Mining and Metallurgical Society is being held.

Article 12 of the by-laws of the Society provides that a letter ballot of the Council on any subject must be held when requested in writing by three members of the Council.

By order of the President a letter-ballot is therefore to be held upon the above motions. Members of the Council are requested to render their votes to the Secretary of the Society with the least possible delay.

Yours respectfully,

LOUIS D. HUNTOON,
Secretary.

Affirmative votes were received from the following Councillors: Philip Argall; J. Parke Channing; A. S. Dwight; J. R. Finlay; Louis D. Huntoon; W. R. Ingalls; W. Lindgren; C. W. Merrill; P. N. Moore; S. W. Mudd; M. L. Requa; George C. Stone.

[Messrs. Goodale, Jennings and Penrose subsequently expressed their approval, making the vote unanimous.]

On September 28 the Secretary informed the President that a majority of the Council had voted in the affirmative on the pending motions. On October 2 the President declared the motions for referendum on the matter of revision of the mining law carried and directed that the regular procedure be followed. On the same day the Secretary issued to the membership the following ballot:

BALLOT.

Issued Oct. 2, 1916.

By vote of the Council of the Society, the members of the Society are requested to express their opinion respecting points involved in a revision of the mining law of the United States, as set forth as follows:

1. Shall it be aimed to preserve to the maximum possible extent the phraseology of our present mining law and its principles of administration, thus retaining the benefit of some of the wealth of legal definitions that have been rendered at great cost?
2. Shall the new mining law be made to cover all classes of valuable mineral deposits other than coal, and shall that intention be defined so clearly that there will be no misunderstanding of it?
3. Shall actual discovery of a valuable mineral deposit be necessary to a valid location of a claim?
4. Or shall the new law authorize mineral locations *without* discovery in any part of the public lands officially classed as mineral; and mineral locations *upon* discovery in any part of the public lands whether officially classed as mineral or non-mineral?
5. Shall there further be a provision permitting bona fide prospecting on land classified as non-mineral and protecting the prospector in the meanwhile?
6. Shall Article 4, if adopted, be further limited so that patent may not be secured until a discovery has been made?
7. Or shall discovery or non-discovery be immaterial in patenting?
8. Or shall there be required a considerably larger payment for land patented without discovery than with it?
9. If Article 6 be adopted shall there be the proviso that only one discovery need be made for a group of contiguous claims of one ownership?
10. Shall mineral claims hereafter located be 660 ft. square, i. e., 10 acres in size and square in form?
11. Or shall they be 1,320 ft. square, i. e., 40 acres?
12. Or shall the claim unit be 660 ft. square, with the proviso that when four units be located in a square of 1,320-ft. sides only the exterior corners (or lines) need be monumented?
13. When the proposed square claims are located on surveyed land shall they be required to be sub-divisions of the surveyed sections?

14. If not located on surveyed land, shall it be required that the boundaries run north and south and east and west?

15. Shall the number of claims located by one person or association be limited or unlimited?

16. If limited, what shall be the limit?

17. Shall existing regulations concerning the marking, notice and record of location be continued?

18. Shall there be the requirement that within 90 days after the date of location, record thereof shall be made in the U. S. Land Office of the district?

19. Or shall the time allowed for recording be more or less than 90 days? If so, what?

20. Shall the annual assessment work be at the present rate, viz., $100 per 20-acre claim, i. e., $5 per acre?

21. Shall it be provided that an equivalent sum of money *may* be paid into the U. S. Land Office in lieu of the performance of assessment work?

22. Or shall it be provided that an increased sum of money—say $7.50 per acre—*may* be paid into the U. S. Land Office in lieu of the performance of assessment work?

23. Shall a person or association holding a group of contiguous claims be permitted to do the assessment work upon one claim and thereby hold the group, the amount of such work to be equivalent to $5 per acre for each claim of the group?

24. Shall a person or association doing assessment work in any one year to the value of more than $50 per 10-acre claim be given credit for the excess in succeeding years, providing, however, that no fractions of $50 shall be considered for this purpose? (If the claim unit be 40 acres, these figures would be raised to $200.)

25. Shall there be emphatic provisions to insure the honest performance of annual assessment work?

26. Shall it be provided that in performing assessment work, labor shall be reckoned at the current rate of wages for miners in the district? Or at some other rate; and if so, what?

27. Shall it be required that every holder of a claim shall file annually a record of his assessment work, accompanied by vouchers, in the Land Office of the district?

28. Shall proceedings for patent remain as now?

29. Shall proceedings for patent remain as now with the proviso that only the exterior boundaries of a group of claims need be monumented?

30. Shall proceedings for patent remain as now with proviso that absence of records in the Land Office of conflicting locations shall be taken as prima facie evidence that none exist that are valid?

31. Article V of the memorandum adopted by the New York Section reads as follows:

"Subject to the existing extralaterial rights of mining claimants or patentees, the holder or patentee of a mining claim located hereafter to have the exclusive right of possession and enjoyment of the surface held by him and of the minerals under it, bounded by vertical planes passing through surface boundaries of said land, but not the right to follow any mineral deposit beyond said planes. And the holders or patentees of claims heretofore located to have similar exclusive possession of all the mineral in said claims that is not covered by any existing extralateral rights."

The above article abolishes extralateral rights in so far as any claims hereafter to be located are concerned. The extralateral rights of existing claims may not be taken away, however, wherefore any new location and grant of patent may be made only with the reservation of such rights. The rights of existing claims having been thus expressly preserved, the last sentence of this article confers upon previously located claims the rights to everything comprised within the vertical projection downward of their side lines that is not legally claimed by anybody else, this being thus an addition to the original extralateral rights.

The above article has received general approval, with scarcely any criticism. The following question is therefore put directly to the membership:

Do you approve Article V of the New York memorandum, or not?

32. Shall it be provided that final entry and payment be made for such claims within seven years after date of location, exclusive of the time covered by pending adverse claims? Shall the time allowed for this purpose be more or less than seven years; if so, what?

33. Shall the new law provide for appeals from decisions of the U. S. Land Office to a court of competent jurisdiction?

PLEASE READ CAREFULLY.

The above questions are in the main so stated that they may be answered categorically, yes or no, and such an answer is desirable. Opposite to each question write "Yes" or "No."

In the bulletin of the Society that will be published about October 3 there are discussions that illuminate many of these questions.

Before voting upon the questions, members are requested to read carefully all of them, for several questions are put in alternative form, and if you vote "Yes" on one alternative you must vote "No" on the others, in order not to cancel your vote.

After voting the ballot, enclose in the accompanying addressed envelope and put your signature in the designated place. Envelopes without signatures will not be opened for canvass. Ballots will be counted on November 1, 1916.

All members are urged to vote this ballot in order that there may be a good determination of the consensus of opinion in the Society.

LOUIS D. HUNTOON,
Secretary.

The letter given below was sent to the secretaries of the following societies: Utah Chapter American Mining Congress; Nevada Mine Operators' Association; Oregon State Mines Association; Idaho Mining Association; Colorado Metal Mining Association; Engineering and Technical Association (Spokane); Northwest Mining Association; Alaska Mining and Engineering Society; American Institute of Mining Engineers; Lake Superior Mining Institute; American Mining Congress; Colorado Scien-

tific Society; Montana Society of Engineers; California Metal Producers' Association.

The members of the Mining and Metallurgical Society of America are voting on a series of questions, whereof copy is enclosed herewith, for the purpose of determining the consensus of opinion among its members respecting points involved in a revision of the mining laws of the United States.

The resolutions of the Council of the Society calling for this referendum included the following:

1. That there be an immediate referendum to members of the Society of questions involved in drafting a new mining law.
2. That the questionnaire be similar in form to what was mailed to members of Council on September 12, 1916.
3. That organizations co-operating in the convention in Washington in December, 1915, be invited to hold a similar referendum, or obtain an expression of the opinion of their memberships according to the provisions of their by-laws, at the same time that the referendum of the Mining and Metallurgical Society of America is being held.

In accordance with that resolution, you are requested to obtain the opinion of your own membership, by whatever method is provided in your Constitution and By-laws, and report same to the Secretary of the Mining and Metallurgical Society of America previous to November 1, 1916.

Yours truly,

LOUIS D. HUNTOON,
Secretary.

REPORT OF TELLERS.

Louis D. Huntoon, Sec'y,
Mining and Metallurgical Society of America,
115 Broadway, New York, N. Y.

Dear Sir:

We, the undersigned, tellers appointed by the President, canvassed the ballot of Oct. 2, 1916, submitted to the membership of the Society on questions relating to revision of the mining law, said questions being as appeared in the minutes of the Council of the Society. We find that the members of the Society voted question by question as follows:

Question No. 1.

"Yes," 110; "No," 4. There were 6 blank ballots and there were several votes with qualifications as follows:

"Not necessarily; especially should leasing system be adopted. Good long leasing system should be considered."

"No, the good of old laws may be incorporated in the new."

"Yes, if a new law is to be passed at all. My belief is that the old law has already done practically all the damage that it will ever do, and what damage might follow from leaving the law as it is would not be a circumstance to the confusion that would arise from enacting a new law."

Question No. 2.

"Yes," 116; "No," 1. There were 3 blank ballots and several votes with qualifications as follows:

"The defect of the old law was that it was intended to cover all classes of mineral deposits. That was its chief defect. But if a new mining law is made to cover all classes of valuable mineral deposits other than coal, the intention should be unmistakable. With this intention to be embodied, I say Yes. I do not think it is practicable to make one new mining law cover all classes of valuable mineral deposits.

"How about petroleum?"

"Exclude quarries, sand pits, etc."

Question No. 3.

"Yes," 16; "No," 83. There were 10 blank ballots and several votes with qualifications as follows:

"No, not for location."

"Not necessarily valuable."

"Group of claims."

"Yes, but not to actual possession of the land marked out pending bona fide attempt to make a discovery."

"I have answered 'Generally speaking, Yes.' However, there are cases where mining claims are located in mineralized districts upon the surface of which there is no indication of mineral, but where underground workings from other claims have proven up mineral at depth in such locations. Some provision should be made for the locating of such claims."

"Yes, except that possible temporary prospecting leases might be provided."

"Yes, except in case of oil."

"No, particularly in the case of oil or gas."

"No, but mineral must be found before issuing patent."

"Think this phrase and idea somewhat indefinite. May mean either valuable deposit of mineral or deposit of valuable mineral."

"Not at first."

"Yes, unqualifiedly."

"No, four preferred."

"Yes. Think word 'valuable' should be omitted."

Question No. 4.

"Yes," 83; "No," 15. There were 15 blank ballots and several votes with qualifications as follows:

"Without discovery on all Government land."

"But patent, of course, should not be issued until discovery."

"Prefer No. 4 to No. 3."

"Better this way."

"Yes, with restrictions."

"Time limit should be given to prove mineral value and protection in interval."

"It should not authorize mineral locations **without** discovery. It should authorize mineral locations **upon** discovery upon any land to which the Government has not already passed title."

Three voted "No" on the first half of question and "Yes" on last half.

One voted on questions 4-9 "Permit brief, 1 yr., protected occupancy during continuous work without discovery. No patent."

Question No. 5

"Yes," 110; "No," 3. There were 5 blank ballots and several votes with qualifications as follows:

"Yes, on public lands."

"I have answered No to question 5 because this would tend to cause a conflict between prospectors and agricultural entry men."

"Yes, for a limited period."

"Essentials covered in answer to No. 4," which reads: "It should not authorize mineral locations **without** discovery. It should authorize mineral locations upon discovery upon any land to which the Government has not already passed title."

One voted on questions 4-9, "Permit brief, 1 yr., protected occupancy during continuous work without discovery. No patent."

Question No. 6.

"Yes," 89; "No," 17. There were 13 blank ballots and several votes with qualifications as follows:

"If adopted, yes."

"Yes, 6, 9, allow two claims without discovery for each contiguous one with discovery."

"Yes, except for oil."

One voted on questions 4-9, "Permit brief, 1 yr., protected occupancy during continuous work without discovery. No patent."

Question No. 7.

"Yes," 12; "No," 70. There were 31 blank ballots and several votes with qualifications as follows:

"Discovery to be material in patenting."

"See 8" answered "Yes."

"No, patent without mineral."

"No, discovery and development should be essential to patent."

"Discovery."

"Discovery to be necessary."

"Discovery to be required."

"No patent without discovery on mineral lands."

"No, upon discovery."

One voted on questions 4-9, "Permit brief, 1 yr., protected occupancy during continuous work without discovery. No patent."

Question No. 8.

"Yes," 18; "No," 57. There were 37 blank ballots and two voted, "No discovery, no patent." There were several votes with qualifications as follows:

"Yes, 50% more."

"Discovery essential to patent."

"No land should be patented as mineral without discovery."

"See 7" answered "Discovery to be required."

"Against any title without."

"Must be discovery."

"No patent without discovery."

"Final discovery to be required."

One voted on questions 4-9, "Permit brief, 1 yr., protected occupancy during continuous work without discovery. No patent."

Question No. 9.

"Yes," 64; "No," 30. There were 20 blank ballots and several votes with qualifications as follows:

"If the number of contiguous claims of one ownership is suitably limited, my reply will be yes."

"Yes, 6, 9, allow two claims without discovery for each contiguous one with discovery. Limit number of claims without discovery."

"Discovery essential on each claim."
"Yes, with limitations."
"Yes, within limits."
"Yes, with reasonable restriction in area."
"Limitation necessary."
"Yes, provided sufficient assessment work be done; on discovery location to cover all additional claims."

One voted on questions 4-9, "Permit brief, 1 yr., protected occupancy during continuous work without discovery. No patent."

Question No. 10.

"Yes," 42; "No," 60. There were 14 blank ballots and several votes with qualifications as follows:
"No, too small."
"Yes, see 12" answered "Yes."
"No, should be 20 acres."
"No, 600 x 1,500."
"Not less than."
"660 ft. square if there is no alternative to this, but preferably 660 ft. by 1,320."
"Allowable range 10 to 40 acres."

Question No. 11.

"Yes," 51; "No," 49. There were 19 blank ballots and several votes with qualifications as follows:
"Allowable range 10 to 40 acres."
"Nor more than."
"No, see 10," answered, "660 ft. square if there is no alternative to this, but preferably 660 ft. by 1,320 ft."
"Yes, or portion thereof."

Question No. 12.

"Yes," 37; "No," 52. There were 25 blank ballots and several votes with qualifications as follows:
"All exterior boundaries to be monumented at 10-acre corner."
"No, 600 x 1,500."
"All corners monumented."
"Favor 10 acres as unit but multiples need not be square. With four monuments only as necessary."
"No, make them 660x1,320."
"No, see 29," answered "No."
"If 10 is adopted, yes."
"Believing that the claim unit should be 660x1,320, my voice is in favor of monumenting each claim."
"No, each and every claim must be monumented."

Question No. 13.

"Yes," 49; "No," 63. There were 10 blank ballots and there was one voted, "Believe they should not be required, but would be in favor of encouraging conformity to the surveyed sections wherever practicable and convenient."

Question No. 14.

"Yes," 56; "No," 63. There were 4 blank ballots.

Question No. 15.

"Limited," 42; "Unlimited," 60. There were 15 blank ballots and several votes with qualifications as follows:

"Limited to ability to do required work."
"Limited in any one given district."
"There should be an economic limit, i. e., make it expensive to hold unworked rights."
"Liberally limited."
"Unlimited if the work be done."
"Limited only by a graduated payment."

Question No. 16.

There were 83 blank votes. Members who had previously voted that the number of claims should not be limited, naturally not voting on question 15. Those who voted in favor of limiting locations are as follows:

Two voted "Ten;" four, "160 acres;" five, "4 claims;" three, "80 acres;" two, "8 claims or 320 acres;" two, "2 claims."
"One claim."
"Six in one camp."
"Forty acres."
"Limited to ability to do required work."
"Four claims, but if in a forest reserve, timber is only to be used on the claims."
"1,280 acres (128 claims)."
"Eight in any one mining district."
"Four claims and if within forest reserve location, should not get the timber rights to more than one claim or its equivalent."
"All claims on which discovery can be made, and for each of these two without discovery."
"Fifteen in one district."
"100 acres, about."
"Sixteen 10-acre claims."
"Four claims to one ownership."
"Say, 10, 12 or possibly 16 claims of 10 acres."
"One-quarter section."
"Eight claims."
"One on each vein."
"Six to ten."
"Ten claims in any one district."
"One claim in any one district."
"Careful consideration of the whole law required."
"Limited only by a graduated payment."

Question No. 17.

"Yes," 91; "No," 3. There were 13 blank ballots and several votes with qualifications as follows:

"Recommend British Columbia marking system as simpler and more easily done by prospector."
"Monumenting should be more permanent and thorough."
"Yes, the provisions as to marking might wisely be made more stringent."
"Yes, with improvements."
"In the main, yes, but provide for record with county recorder. Abolish district recorders."
"Yes, with the exception that mining locations should be recorded in the land office instead of county recorder's office."
"In the main. See 18," which reads, "Yes, except in Alaska, where six months should be given."

"So far as possible, but all idea of conformity to local usages eliminated."
"Better marking and recording advisable."
"Yes, in strict compliance with the regulations made obligatory."
"Monumenting notices should be much improved and made permanent."
Two voted "More stringent," and two "Yes, plus 18."
One voted "Federal laws do not require any notice of location to be recorded."

Question No. 18.

"Yes," 94; "No," 9. There were 9 blank ballots and several votes with qualifications as follows:
"No, county record only."
"Yes, see 30," answered "Yes."
"Yes, except in Alaska, where six months should be given."
"Yes, by county recorder."
"Think 90 days satisfactoroy, but 2 to 4 months, about equally so."
"Yes, in Continental U. S."
"Ninety days county record."
"Record thereof should be required in 90 days, not in U. S. Land Office, but in county recorder's office."
"Yes, for U. S. main part. (Alaska excluded.)"
"Yes, in U. S."

Question No. 19.

"No," 25. There were 68 blank ballots, and 7 voted "90 days;" 5, "60 days;" 3, "120 days;" 3, "30 days," and there were several votes with qualifications as follows:
"This is a reasonable limit."
"Prefer 30 days."
"Less than 90, within 30 days."
"No, except special cases."
"Six months in Alaska and Islands."
"Six months, Land Office."
"Eighteen days."
"Shorter time but with right correction in detail description."
"180 outside of U. S."
"90 days in Continental U. S. More in Alaska, say six months."
Two voted "six months."

Question No. 20.

"Yes," 96; "No," 2. There were 8 blank ballots and several votes with qualifications as follows:
"$100 per claim of whatever size."
"$100 per claim."
"$100 for 40 acres."
"Pay $1 per acre annual rent."
"$100 per square claim."
"No, $100 cash tax."
"$5 per acre."
"No, $100 per 10 acres."
"No, work assessment, but cash payment."
"$200 for 40 acres."
"Yes, a fraction figured as a full claim."
"Annual assessment work should be $100 per claim."
"Be more."
Two voted "$10 per acre" and two "No, make it $2.50 per acre."

Question No. 21.

"Yes," 26; "No," 76. There were 16 blank ballots and several votes with qualifications as follows:

"Yes, rent."
"Cash only."
"Yes, prefer this method to assessment work."
"No, preferably increased sum, say double the assessment rate."
"Yes, if used for surveys."

Question No. 22.

"Yes," 42; "No," 63. There were 13 blank ballots and several votes with qualifications as follows:

"One-half to U. S., one-half to state."
"Yes, at $10, if money be substituted for labor."
"Would suggest double the assessment rate."
"Amount of work should be optional with owner, but a time limit placed for proving mineral value of ground."
"50 to 100%."

Question No. 23.

"Yes," 99; "No," 13. There were two blank ballots and several votes with qualifications as follows:

"Yes, on any one of 40 acres."
"$100 per claim."
"Yes, at $100 per claim."
"Yes, but $2.50 per acre."
"In land classified as mineral; not in non-mineral land."
"Should be limited as to number."
"Under certain restrictions as to size of group."
"Yes, if such work actually tends to develop each and every claim of the group, not otherwise."
"2.50 per acre."

Question No. 24.

"Yes," 42; "No," 67. There were five blank ballots and several votes with qualifications as follows:

"Not over two years."
"Yes, for one year following."
"For one year only."
"Time limit 5 years."
"Yes, for three years only."
"Yes, as long as assessment work is understood as development and improvement only."
"Yes, under competent supervision."
"Yes, with proper proof."
"No, difficult to administer."

Question No. 25.

"Yes," 110; "No," 2. There were two blank ballots and several votes with qualifications as follows:

"Yes, this is most important."
"Yes, but prefer rent."
"Yes, and affidavit must state exact place on claims where labor was done."
"Place sworn vouchers in U. S. Land Office."
"Yes, if intelligently controlled."
"Yes, time limit."
"Yes, important."

"Yes, affidavit of assessment work should describe exact location where work was done."
"Yes, much more necessary than now."

Question No. 26.

"Yes," 62; "No," 3. There were 4 blank ballots and 40 voted "Current rate" and 2, $3 per day." There were several votes with qualifications as follows:
"Current rate plus supplies."
"No, $4 per day."
"In surface work, pay of common labor in district; deeper work, that of miners."
"Miners' wages."
"No, actual cost."
"Yes, or upon cubic yards removed, or in case of oil or gas, on depth of hole drilled."
"Current rate preferable."
"Not to exceed $4 per day."
"Current rate if done by the men themselves."
"Actual cash."
"District rate."
"No, at $3.50 a day."

Question No. 27.

"Yes," 108; "No," 3. There were 5 blank ballots and 3 voted "File with county recorder." There were several votes with qualifications as follows:
"Yes, without vouchers."
"Yes, but would suggest that the record be accompanied either by an affidavit or voucher."
"Or with county recorder."
"Every claim holder should file affidavit of labor verified with county recorder."

Question No. 28.

"Yes," 44; "No," 30. There were 43 blank ballots and several votes with qualifications as follows:
"Probably must be modified."
"Yes, except 30."
"Yes, except perhaps reduce period of advertising."
"Yes, as far as consistent with new law, if passed."
"Yes, but improved."
"Substantially."

Question No. 29.

"Yes," 54; "No," 39. There were 26 blank ballots and several votes with qualifications as follows:
"Yes (all exterior boundaries to be monumented at 10-acre corners)."
"You can safely leave that to be covered by the U. S. Interior Dept. Believing that the claim unit should be 660x1,320, my voice is in favor of monumenting each claim."
"No, all monuments should be put in well."
"Yes, time limit required."

Question No. 30.

"Yes," 73; "No," 16. There were 28 blank ballots and several votes with qualifications as follows:
"Yes, time limit required."

"No, I think this question would be covered by adverse proceedings."
"As to future locations, but not as to past."
"Yes except not retractive."
"More study."
"No, but U. S. Land Office has absolutely nothing to do with that."

Question No. 31.

"Yes," 120; "No," 1; "Blanks," 2.

Question No. 32.

"Yes," 39; "No," 10. There were 14 blank ballots and 28 voted "7 years;" 13, "5 years;" 6 "10 years" and 3 "No limit." There were several votes with qualifications as follows:
"Present practice should be continued and no claimant forced to patent so long as he prefers to do $100 bona fide work per year."
"Requires study."
"Not until discovery."
"No, unlimited."
"Final entry not required."
"More than 7 years."
"7-year limit with privilege of extension for three years on condition of active continuous work and extra payment."
"Four years."
"No, as long as assessment work is properly conducted."
"Three years."

Question No. 33.

"Yes," 106; "No," 8. There were 7 blank ballots and two votes with qualifications as follows:
"The new law should provide if necessary for all questions relating to adverse claims of mineral lands being decided by a court of competent jurisdiction.
"Requires study."

Yours very truly,

FLOYD W. PARSONS,
DONALD M. LIDDELL,
Tellers.

New York, Nov. 2, 1916.

The President of the Society declared the result reported by the tellers to be the vote of the Society.

LOUIS D. HUNTOON,
Secretary.

NORTHWEST MINING ASSOCIATION.

Louis D. Huntoon, Secy.,
Mining and Metallurgical Society of America,
115 Broadway, New York.

Dear Mr. Huntoon:

Owing to our correspondence, the secretary has requested me to forward the enclosed resolutions which were passed today after a long discussion.

Our organization includes active mining men over the entire Pacific Northwest, including British Columbia, and our today's meeting was well attended in response to a call for open discussion of the proposed changes. There were no dissenting opinions as to the recommendations themselves, though naturally there was some difference of opinion as to manner of carrying out details. But as we shall, of course, have the privilege of examining the proposed bill after it is completed—and before presentation to Congress—all discussion of details was laid over.

You will note several departures from your questionnaire, all of which we hope will receive very careful attention at the hands of the revision committee inasmuch as we believe they are in line to promote active exploration and development of our remaining mineral resources.

Very sincerely yours,

F. A. Ross,
Chairman.

October 12, 1916.

Resolutions Concerning Mining Law Revision, Adopted by the Northwest Mining Association at Its Regular Meeting, Oct. 12, 1916.

Whereas, it is generally understood and agreed in mining circles that a revision of our Federal Mining Laws has become absolutely necessary to the welfare of the mining industry of the United States, and

Whereas, it is the belief of the members of the Northwest Mining Association that any new code that may be enacted should be as free from restrictions as possible, offering every inducement to those wishing to prospect for mines and to operate them, and guarding only against fraudulent appropriations of public lands for purposes other than those pertaining to mining, and

Whereas, the Mining and Metallurgical Society of America has undertaken to draft an adequate bill for presentation to Congress, which bill shall cover all necessary changes in our present mining laws; and

Whereas, the mining committee of the said Society has requested a statement of the views of members of this organization in respect to the proposed changes outlined in a questionnaire, dated October 2, 1916; now, therefore be it

Resolved, That this organization submit the following suggestions and replies to the aforesaid questionnaire as an official expression of the opinion of its members:

1. The phraseology, legal definitions and principles of administration of our present mining laws should be preserved to the maximum extent possible.

2. The new mining laws should cover clearly and definitely all classes of valuable mineral deposits other than coal.

3. The new laws should authorize mineral locations *without* discovery in any part of the public lands officially classed as mineral.

4. The new laws should authorize mineral locations *upon* discovery in any part of the public lands whether officially classed as mineral or non-mineral or set aside as reserves;.hence

5. There should be an express provision permitting bona fide prospecting upon all public lands, as above described, and protecting the prospector meanwhile.

6-9. Patents should not be granted unless a discovery of mineral has been made; provided, however, that this shall not apply to mill, tramway or tunnel sites or to other ground conclusively shown to be necessary to successful mining operations.

The number of claims *patentable* upon a *single* discovery of mineral should be limited to *four contiguous* claims whether the same be grouped about the point of discovery or located along a well-defined strike, or in series where no outcrop is apparent.

10-12. This organization strongly advocates the adoption of a standard claim 1500 *ft. square* (51.65 acres) because this is the square of the long side of our present claims and it introduces no fractions of 100 ft. Under the proposed abandonment of the extralateral right a claim of this size is none too large while the difference between its area and that of a claim 1320 ft. square is not sufficient to cause hesitation. This organization is unqualifiedly opposed to the adoption of a claim containing less than 40 acres since smaller units would merely confuse locators and require more locations to be made.

13-14. For several practical and important reasons, this organization is also unqualifiedly opposed to the idea of requiring claims to be located as subdivisions of surveyed sections or with lines running north-

south and east-west on unsurveyed lands. Such conformity is both impracticable and unnecessary; to enforce it would be merely to place additional obstacles in the way of the prospector, particularly in rough or heavily timbered and brushed districts. No possible confusion could result from permitting the locator to use his own judgment in staking his claims since all claims require readjustment when accurately surveyed and fractions are bound to occur in any case and under any system. Moreover, the abandonment of the extralateral right will automatically remove practically all the difficulties introduced by our present system.

15-16. The number of claims locatable by one person or association should be unlimited.

17. The present regulations governing marking, notice and record of locations are susceptible of considerable improvement. They should be so changed that the public may easily discover (upon the ground) what land has been covered by claims and by whom. The present method of staking and marking is shiftless and temporary in a large majority of instances. The official surveyor alone should destroy all corner posts of abandoned claims after having noted their exact location for record wherever such notation is necessary; a penalty should be provided for the removal, or destruction, of corner-posts by any one but the surveyor. The locator should be permitted to stake his claims according to his judgment, provided only that they be so staked and the stakes so plainly marked that the boundaries of his claims may easily be followed.

18-19. Notice of location should be filed as soon as possible in the public office of record of the district or county in which the location is made, but not necessarily at a U. S. Land Office. The latter is often too distant. Ninety days after location should be the limit for recording in the United States. .

21-27. This organization strongly recommends and urges that the amount of the annual assessment work be set at $100 per claim or fraction thereof, as at present. Without extralateral rights this is sufficient; any larger sum would very probably discourage prospecting.

All assessment work should be reckoned at the current wages of miners in the district.

Assessment work should be permitted upon one or more claims of a group of contiguous claims, provided that such work is so begun and continued as to constitute a development of the entire group.

If the amount of assessment work performed upon a single claim, or fraction, in a single year is in excess of $100, then the excess sum should be made a credit against the work to be done in the following year, or years, at that rate, provided that no fraction of $50 be allowed.

If the amount of assessment work performed upon a group of contiguous claims, or fractions of claims, shall exceed a sum equal to the number of claims, or fractions, multiplied by 100, then the said excess should be made a credit against the work to be done in the following year, or years, provided that no fractions of $100 be allowed.

In lieu of the performance of actual assessment work, the owner should be permitted to pay into the office of record of the district (not necessarily a U. S. Land Office) the sum of $200 for each claim or fraction of a claim; and all sums so paid should be made a fund to be used in road-building or in such other work as will better the mining conditions of the district in question.

All sums expended in the survey of claims should be counted as annual assessment work.

Any new law that is enacted should contain emphatic provisions that shall insure the honest performance of assessment work.

Every holder of a claim, or fraction of a claim, should be required to file an annual statement of his assessment work, and severe penalties should be imposed for the falsifying of these returns.

28-30. After careful scrutiny, existing patent regulations should be simplified wherever possible. Often, at present, they operate to cause vexatious delays. The question of monumenting groups, instead of claims, is open to debate but it would seem best to monument each claim, as guides to an interested public, since some groups are very large.

Absence of records in the recording office of the district should be the prima facie evidence of the non-existence of conflicting claims.

32. Seven years after date of location, exclusive of time covered by pending adverse claims, is sufficient time for the payment and final entry.

33. This organization strongly urges the abolition of extralateral rights and hereby endorses Article V of the memorandum of the N. Y. Section of the Mining and Metallurgical Society of America.

33. Without question there should be granted the right of appeal from the decisions of the U. S. Land Office to a court of competent jurisdiction.

COMMITTEE ON RESOLUTIONS, NORTHWEST MINING ASSOCIATION,
FRANK A. ROSS, *Chairman,*
OSCAR CAIN,
CHAS. A. GRAM.

Spokane, Washington, October 12, 1916.

The above is a verbatim copy of Resolutions passed at the regular meeting of the Northwest Mining Association, October 12, 1916.

G. B. DENNIS,
President.
F. C. BAILEY,
Secretary.

NEVADA MINE OPERATORS' ASSOCIATION.

Louis D. Huntoon, Secretary,
Mining and Metallurgical Society of America,
115 Broadway, New York City.

Dear Sir:

At a meeting of the executive committee of this association held October 9 your letter of October 2 was presented, with the result that I am directed to forward to you the enclosed ballot, which indicates the attitude of this association on the questions propounded by your Society in regard to the revision of the Federal mining laws.

Yours very truly,

HENRY M. RIVES,
Secretary.

Reno, Nev., October 11, 1916.

The votes on the several paragraphs of the questionnaire, printed on p. 221 of this bulletin, were as follows:

1.	Yes.	17.	Yes.
2.	Yes.	18.	No.
3.	No.	19.	....
4.	Yes.	20.	Yes.
5.	Yes.	21.	No.
6.	....	22.	No.
7.	....	23.	Yes.
8.	Yes.	24.	No.
9.	No.	25.	Yes.
10.	No.	26.	Yes.
11.	Yes.	27.	Yes, perjury for false affidavit.
12.	No.	28.	See 29.
13.	No.	29.	Yes.
14.	No.	30.	No.
15.	Unlimited.	31.	Yes.
16.	....	32.	Yes.

33. Yes.

CALIFORNIA METAL PRODUCERS' ASSOCIATION.

Louis D. Huntoon, Sec'y,
Mining and Metallurgical Society of America,
115 Broadway, New York.

Dear Sir:

Enclosed find tabulation of 9 votes mailed this day, submitted by members of this Association. Please be advised that 9 ballots were all that were cast by members of the Association and this is simply a tabluation of the ballots sent under separate cover.

Yours very truly,

ROBERT I. KERR,
Secretary.

The tabulation of votes by members of the California Metal Producers' Association is as follows:

1. "Yes," 9.
2. "Yes," 9.
3. "Yes," 3; "No," 6.
4. "Yes," 6; "No," 3.
5. "Yes," 7; "No," 1.
6. "Yes," 7; "No," 2.
7. "No," 7.
8. "Yes," 3; "No," 3.
9. "Yes," 6; "No," 1.
10. "Yes," 4; "No," 4.
11. "Yes," 3; "No," 3.
12. "Yes," 6; "No," 3.
13. "Yes," 4; "No," 5.
14. "Yes," 4; "No," 5.
15. "Limited," 5; "Unlimited," 4.
16. .....
17. "Yes," 8.
18. "Yes," 8; "No," 1.
19. "No," 2.
20. "Yes," 8; "No," 1.
21. "Yes," 8; "No," 1.
22. "Yes," 4; "No," 5.
23. "Yes," 9.
24. "Yes," 2; "No," 7.
25. "Yes," 9.
26. "Yes," 7.
27. "Yes," 9.
28. "Yes," 2; "No," 4.
29. "Yes," 7; "No," 2.
30. "Yes," 6; "No," 2.
31. "Yes," 9.
32. .....
33. "Yes," 8.

AMERICAN INSTITUTE OF MINING ENGINEERS.

Louis D. Huntoon, Secretary,
Mining and Metallurgical Society of America,
115 Broadway, New York.

Dear Mr. Huntoon:

Your letter of October 2, 1916, regarding a referendum vote of the members of this Institute concerning the best method for the revision of the mining laws, was presented at the meeting of the Board of Directors, held on October 27, 1916. The chairman was authorized to appoint a committee to confer with a corresponding committee of the Mining and Metallurgical Society on this subject. The chairman oppointed Messrs. J. R. Finlay, D. C. Jackling, Hennen Jennings and C. F. Kelley.

Faithfully yours,

BRADLEY STOUGHTON,
Secretary.

SUMMARY OF BALLOTS ON MINING LAW REVISION.

The expression of opinion by members of the Mining and Metallurgical Society of America was well representative, a larger proportion of the membership having paid attention to the ballot than appears from the figures; for a good many returned their ballots in blank, saying that they had no good knowledge of the subject, being metallurgical men, or otherwise.

There were 123 votes received, and inasmuch as there were 33 questions on the ballot, the counting of the ballot involved 4,059 entries, besides the memoranda of members who did not vote "yes" or "no," but introduced qualifications. This absorbed the time of a clerk for four days, and the result was completed only a few minutes before the meeting of the council to consider it. If the tellers had had more time they would probably have been able to decide that certain qualified votes really meant "yes," or "no." The vote has been summarized in the following table, in which "QY" means qualified votes that may properly be construed as affirmative, and "QN" means similarly as to the negative. The table includes also the votes of the Northwest Mining Association (N. W. M. A)., the Nevada Mine Operators Association (N. M. O. A.) and the California Metal Producers Association (C. M. P. A.) The first and second of those organizations voted as a body and the expression of their opinion, affirmative or negative, is indicated by an asterisk.

SUMMARY OF MINING LAW VOTE.

	Yes	No	Blank	QY	QN
Question 1.					
1. M. M. S. A.	110	4	6	1	1
2. N. W. M. A.	*	..	..	..	..
3. N. M. O. A.	*	..	..	..	..
4. C. M. P. A.	9	..	..	..	..
Question 2.					
1. M. M. S. A.	116	1	3	..	3
2. N. W. M. A.	*	..	..	..	..
3. N. M. O. A.	*	..	..	..	..
4. C. M. P. A.	9	..	..	..	..
Question 3.					
1. M. M. S. A.	16	83	10	5	5
2. N. W. M. A.	*	..	..	..	..
3. N. M. O. A.	..	*	..	..	..
4. C. M. P. A.	3	6	..	..	..
Question 4.					
1. M. M. S. A.	83	15	15	7	3
2. N. W. M. A.	*	..	..	..	..
3. N. M. O. A.	*	..	..	..	..
4. C. M. P. A.	6	3	..	..	..

		Yes	No	Blank	QY	QN
	Question 5.					
1.	M. M. S. A.	110	3	5	2	1
2.	N. W. M. A.	*	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	7	1	..	..	..
	Question 6.					
1.	M. M. S. A.	89	17	13	3	..
2.	N. W. M. A.	*	..	..	..	..
3.	N. M. O. A.	..	..	..	..	..
4.	C. M. P. A.	7	2	..	..	..
	Question 7.					
1.	M. M. S. A.	12	70	31	1	8
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	..	..	..	..	..
4.	C. M. P. A.	..	7	..	..	..
	Question 8.					
1.	M. M. S. A.	18	57	37	..	..
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	3	3	..	..	..
	Question 9.					
1.	M. M. S. A.	64	30	20	..	..
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	..	*	..	..	..
4.	C. M. P. A.	6	1	..	..	..
	Question 10.					
1.	M. M. S. A.	42	60	14	4	3
2.	N. W. M. A.	..	*	..	..	..
3.	N. M. O. A.	..	*	..	..	..
4.	C. M. P. A.	4	4	..	..	..
	Question 11.					
1.	M. M. S. A.	51	49	19	..	..
2.	N. W. M. A.	..	*	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P A.	3	3	..	..	..
	Question 12.					
1.	M. M. S. A.	37	52	25	..	..
2.	N. W. M. A.	..	*	..	..	..
3.	N. M. O. A.	..	*	..	..	..
4.	C. M. P. A.	6	3	..	..	..
	Question 13.					
1.	M. M. S. A.	49	63	10	..	..
2.	N. W. M. A.	..	*	..	..	..
3.	N. M. O. A.	..	*	..	..	..
4.	C. M. P. A.	..	..	..	..	..
	Question 14.					
1.	M. M. S. A.	56	63	4	..	..
2.	N. W. M. A.	..	*	..	..	..
3.	N. M. O. A.	..	*	..	..	..
4.	C. M. P. A.	4	5	..	..	..
	Question 15.	Limited	Unlimited			
1.	M. M. S. A.	42	60	15	4	2

	Limited	Unlimited	Blank	QY	QN
2. N. W. M. A.	..	*	..	..	..
3. N. M. O. A.	..	*	..	..	..
4. C. M. P. A.	5	4	..	..	..
Question 16.					
	Yes	No			
1. M. M. S. A.	..	..	83	..	..
2. N. W. M. A.	..	..	..	..	..
3. N. M. O. A.	..	..	..	..	..
4. C. M. P. A.	..	..	..	..	..
Question 17.					
1. M. M. S. A.	91	3	13	6	6
2. N. W. M. A.	..	..	..	..	..
3. N. M. O. A.	*	..	..	..	..
4. C. M. P. A.	8	..	..	..	..
Question 18.					
1. M. M. S. A.	94	9	9	6	1
2. N. W. M. A.	*	..	..	..	..
3. N. M. O. A.	..	*	..	..	..
4. C. M. P. A.	8	1	..	..	..
Question 19.					
1. M. M. S. A.	..	25	68	..	..
2. N. W. M. A.	..	*	..	..	..
3. N. M. O. A.	..	..	..	..	..
4. C. M. P. A.	..	2	..	..	..
Question 20.					
1. M. M. S. A.	96	2	8	3	9
2. N. W. M. A.	..	..	..	..	..
3. N. M. O. A.	*	..	..	..	..
4. C. M. P. A.	8	1	..	..	..
Question 21.					
1. M. M. S. A.	26	76	16	3	1
2. N. W. M. A.	*	..	..	..	..
3. N. M. O. A.	..	*	..	..	..
4. C. M. P. A.	8	1	..	..	..
Question 22.					
1. M. M. S. A.	42	63	13	5	..
2. N. W. M. A.	..	..	..	..	..
3. N. M. O. A.	..	*	..	..	..
4. C. M. P. A.	4	5	..	..	..
Question 23.					
1. M. M. S. A.	99	13	2	4	..
2. N. W. M. A.	..	..	..	..	..
3. N. M. O. A.	*	..	..	..	..
4. C. M. P. A.	9	..	..	..	..
Question 24.					
1. M. M. S. A.	42	67	5	8	1
2. N. W. M. A.	..	..	..	..	..
3. N. M. O. A.	..	*	..	..	..
4. C. M. P. A.	2	7	..	..	..
Question 25.					
1. M. M. S. A.	110	2	2	9	..
2. N. W. M. A.	*	..	..	..	..

		Yes	No	Blank	QY	QN
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	9	..	..	..	..
	Question 26.					
1.	M. M.S. A.	62	3	4	48	6
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	7	..	..	..	..
	Question 27.					
1.	M. M. S. A.	108	3	5	6	1
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	9	..	..	..	..
	Question 28.					
1.	M. M. S. A.	44	30	43	5	1
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	..	..	..	..	..
4.	C. M. P. A.	2	4	..	..	..
	Question 29.					
1.	M. M. S. A.	54	39	26	2	1
2.	N. W. M. A.	..	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	7	2	..	..	..
	Question 30.					
1.	M. M. S. A.	73	16	28	3	2
2.	N. W. M. A.	*	..	..	..	..
3.	N. M. O. A.	..	*	..	..	..
4.	C. M. P. A.	6	2	..	..	..
	Question 31.					
1.	M. M. S. A.	120	1	2	..	..
2.	N. W. M. A.	*	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	9	..	..	..	..
	Question 32.					
1.	M. M. S. A.	39	10	14	50	5
2.	N. W. M. A.	*	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	..	..	..	..	..
	Question 33.					
1.	M. M. S. A.	106	8	7	1	..
2.	N. W. M. A.	*	..	..	..	..
3.	N. M. O. A.	*	..	..	..	..
4.	C. M. P. A.	8	..	..	..	..

This vote shows clearly that with respect to matters of detail, such as area of claims, orientation of claims, etc, there is a difference of opinion, but upon the fundamental principles there is almost unanimity of opinion among the members of the Mining and Metallurgical Society, while the California, Nevada and Northwestern mine operators are in complete harmony with the expression by the M. M. S. A.

LOUIS D. HUNTOON,
Secretary.

COLORADO SCIENTIFIC SOCIETY.

The following communication was received subsequent to the meeting of the Council on Nov. 6, and too late for the summary of the opinions expressed by other societies.

Louis D. Huntoon, Secretary,
Mining and Metallurgical Society of America,
115 Broadway, New York.

Dear Sir:

I am enclosing herewith a copy of the report which our committee on the revision of the mining law made to the Scientific Society at our last regular meeting on November 4. We submitted to our members the same list of questions which the Mining and Metallurgical Society had prepared and when our committee made up its final report it was guided in some measure by the answers that were made to these questions. The report, however, is self-explanatory and I trust will be of some value to you as it represents the best thoughts which Mr. Collins and his associates could put up. I feel that we had a good committee and that the members have labored faithfully and I am sure you will find conclusions worthy of some consideration.

Very truly yours,

H. C. PARMELEE,
President.

November 6, 1916.

H. C. Parmelee, President,
The Colorado Scientific Society.

Dear Sir:

The committee to which the above subject was referred beg to submit the following report:

We have further considered the matters submitted to us, with special reference to the question-form recently issued to its members by the Mining and Metallurgical Society of America, and which was also submitted to our own membership for ballot.

From our members only 18 replies were received. The enclosed sheets will show these replies in a tabulated form.

In arriving at their own report, your committee have given weight to the majority opinion among our membership, as indicated by these replies. In view, however, of the obvious fact that the questions require special study of the subject, which many members cannot be expected to have given, and also to the apparent lack of appreciation on the part of some members of the exact meaning of the questions, your committee have based their report on their own convictions, resulting from mature study and not entirely on the majority opinions, especially where the majority is not pronounced.

Question 3 as propounded by the Mining and Metallurgical Society reads as follows:

"Shall actual discovery of a valuable mineral deposit be necessary to a valid location of a claim?"

This question has evidently been misunderstood by many members, as is shown by their replies to succeeding questions. A *valid* location, particularly if it may be maintained in force as a location for an indefinite period is an absolute title, and if discovery were not required as a preliminary for such a location, it would be tantamount to abolishing the discovery requirement altogether. While, therefore, a large majority of our members answered the question in the negative, their replies to subsequent questions indicate that this is not what they intended. We are inclined to think questions 18 and 21 have also been imperfectly understood. It is perhaps inevitable that any set of questions drawn up as the present list was drawn would prove in some respect misleading, and that some questions of importance should be left unasked.

The following conclusions of your committee refer by number to the specific questions submitted in the list:

1 and 2. Your committee, and the membership of your Society, answer these questions in the affirmative.

3 and 4. Your committee have not found themselves able to reach an agreement as to whether the discovery requirement should be waived entirely. A majority of the committee are unwilling to see the requirement abolished, but desire that actual possession of a delimited claim should be legalized pending bona fide effort to make discovery. There is general agreement that mineral locations should be permitted upon discovery on all public lands, whether officially classed as mineral or non-mineral.

5. Prospecting should be permitted, and the prospector protected, on land classified as non-mineral.

6 and 7. If location without discovery is permitted, patent should not be issued until discovery is made.

8. We see no merit in the suggestion that there should be a larger payment for land patented without discovery.

9. Your committee and the members of the Society are evenly divided on the question whether one discovery should be sufficient for a group of contiguous claims under one ownership.

10 and 11. Your committee cannot agree as to area of claims. If the unit is made sufficiently small, they agree that there is some advantage in requiring claims to be rectangular, made of square units disposed in any form desired. Small claims, in the opinion of part of the Committee, would be inadmissible, unless an affirmative reply is given to question 9. No member of the committee favors a larger claim than 40 acres, as a maximum, but some of the committee favor 2½-acre units with a maximum area of 20 acres, arranged as desired by the locator.

12. We consider it advisable that every claim should be independently monumented.

13 and 14. Your committee consider that the unsatisfactory condition of the public survey, the irregularity and unsatisfactory monumenting of existing sections in many localities, and the difficulty of finding section corners without the assistance of a surveyor, preclude the use of sub-divisions of the public survey, however theoretically desirable this system might be.

It is desirable that all boundaries should be north and south and east and west.

15 and 16. There should be no limit to the number of claims any person or association is permitted to locate.

17. Existing regulations concerning the marking, notice and record of locations should be continued substantially as at present, but your

committee think that the regulations should be revised and made more stringent, and that uniform Federal regulations should replace those of the individual States.

18, 19 and 27. It would seem that most of our members did not realize that this question implied a change in the place for record as well as the question of time for record.

Your committee are unanimously of opinion that the United States Land Office records should not be burdened with location certificates and affidavits of annual labor, in respect of claims, the great majority of which are never patented.

Furthermore, the committee consider that the time allowed for record with the County Recorder, in view of the improved facilities which now exist, might with advantage be shortened to 60 days.

20, 21 and 22. A majority of the replies to question 20 from our members is in the affirmative. A majority of your committee, however, prefer that the rate should be the same as that which has usually prevailed in Colorado, viz. $10 per acre.

They do not think it desirable to provide for a payment into the Land Office in lieu of the actual performance of assessment work on the ground.

23. The owner of a group of contiguous claims should be permitted to do the assessment work on one claim for the entire group, when the work performed benefits the group.

24. Your committee are emphatically of opinion that excess assessment work done in one year should not be credited to succeeding years.

25 and 26. Our members, and the committee, are unanimously of opinion that adequate provision should be made for the ensuring of bona fide performance of annual assessment work.

In figuring its value, the cost of labor should be figured at the current rate in the district for a similar character of work.

27. Certificates of assessment work should be required annually, should specify the exact place and manner in which the work was performed, and should be filed in the office of the County Recorder accompanied by vouchers or other corroborative evidence.

28 and 29. Proceedings for patent should remain substantially as now provided. We think that every claim should be monumented, and we incline to think it should be provided that every such monument should be visible from the next.

30. Your committee do not think it advisable to record locations in the Land Office at all, and it would therefore be inadmissible that absence of conflicting locations in the Land Office records should be taken as evidence that no conflicts exist.

31. Your committee approve the proposal for abolition of the extra-lateral right for future mineral claims, in the form proposed.

32. Your committee are unanimously of opinion that no requirement of patent within any fixed period should be exacted.

33. Your committee are unanimously of opinion that any new mining law should provide for appeal to the Courts from decisions of the United States Land Office.

The above is respectfully recommended to the consideration of the Society.

For the Committee,

GEORGE E. COLLINS,
Chairman.

Nov. 1, 1916.

MEETINGS OF SECTIONS.

NEW YORK.

Meeting of October 19, 1916.

The New York Section of the Mining and Metallurgical Society of America met at the Engineers' Club, New York, on October 19. The members present were the following: H. M. Chance; J. Morgan Clements; J. R. Finlay; H. W. Hardinge; W. R. Ingalls; J. E. Johnson; J. Volney Lewis; Robert Peele; F. E. Pierce; John Roger; F. T. Rubidge; M. B. Spaulding; J. H. Susmann and G. D. Van Arsdale.

Mr. Ingalls having declined to accept the chairmanship of the Section, to which he was elected at a previous meeting, Mr. Finlay, President of the Society, occupied the chair.

The first business being the election of chairman for the ensuing year, Morril B. Spaulding was elected unanimously. W. R. Ingalls was appointed secretary pro tem. for the meeting.

Professor Benjamin Leroy Miller, of Lehigh University, who was guest of J. E. Johnson, Jr., addressed the meeting on the subject of the "Iron and Manganese Deposits of Brazil," which he had lately examined. He described the enormous extent of these deposits, their high grade and excellent quality, but also pointed out clearly their present inaccessibility and said they were commonly regarded as an iron reserve of the future.

Following Professor Miller there was general discussion of the geology and origin of iron ore deposits, especially those of Brazil, in which several members participated.

At the previous meeting of the Section a report of a committee on offering a testimonial to H. C. Hoover in recognition of his great services to humanity was received and adopted. Attention being drawn to the fact that the action of the Section in this matter was contrary to the rules of the Society and therefore ineffectual, a motion was made that the report of the committee on testimonial to H. C. Hoover be adopted and be forwarded to the Council with the request that it act accordingly. This motion, having been duly seconded, was unanimously carried.

A vote of thanks to Professor Miller for his instructing and interesting address was also carried.

The remainder of the session was devoted to an informal discussion of the litigation respecting the flotation process and the recent decision at Wilmington in the case against the Miami Copper Co.

The meeting adjourned at about 10 p. m.

W. R. Ingalls,
Section Secretary pro tem.

CHANGES OF ADDRESS.

Johnson, W. McA.....69 Vernon St., Hartford, Conn.
Nichols, Ralph.....P. O. Box 204, Salt Lake City, Utah
Rissmann, Otto.....3615 Central Ave., Kansas City, Mo.
Spaulding, Morril B.....235 Amity St., Flushing, L. I.

MEMBER ELECTED IN OCTOBER.

Probert, Frank H.....University of California, Berkeley, Calif.
Professor of Mining.

PERSONALS.

R. Gilman Brown recently returned to London from Russia.

J. Parke Channing has been at Miami, Ariz., recently.

Will L. Clark, manager of the United Verde Copper Co. since 1904, has resigned that position.

G. H. Clevenger, Walter Douglas, Sidney J. Jennings, Seeley W. Mudd and Bradley Stoughton were among those who took the recent trip of the American Institute of Mining Engineers to the Southwest for the Arizona meeting.

J. V. N. Dorr has been awarded the John Scott medal and premium by the Franklin Institute of Philadelphia for his hydrometallurgical apparatus.

Walter Douglas, of Phelps, Dodge & Co., recently visited the mines and mills of the Detroit Copper Mining Co. at Morenci, Ariz.

James F. Kemp, head of the department of geology of Columbia University, has much improved in health. The trustees of the University have, however, granted him a further leave of absence for one year.

J. Volney Lewis has just returned to his duties at Rutgers College, after a prolonged trip through the western mining states, British Columbia and Alaska, in the interests of a development company.

C. H. Macnutt has obtained a commission in the Royal Canadian Engineers, Canadian Expeditionary Force.

Richard A. Parker has been elected chairman of the mining bureau of the Denver Civic and Commercial Association.

A. P. Rogers has just returned to New York from a professional trip in Dutch Guiana.

E. Gybbon Spilsbury has gone to Cuba on professional work and will be absent three weeks.

Mining and Metallurgical Society *of* America

Vol. IX November 30, 1916 No. 11

ANNOUNCEMENTS.

Annual Meeting.—With this bulletin we are sending proxies for the forthcoming annual meeting of the Society. According to the Constitution, business may not be transacted unless one-third of the membership be present in person or be represented by proxy. Inasmuch as there is no likelihood of an attendance of 33 1/3 per cent. it is necessary to have a large representation by proxy in order to perform the usual proceedings of the annual meeting, including the adoption of reports of officers, etc. Every member who does not intend to be present in person is urgently requested to execute a proxy in the name of some member who will be present and forward same either to that member or to the Secretary of the Society.

Annual Medal.—Prof. James F. Kemp passed through New York the week of November 6, on his way from Lake George to Melbourne, Florida. During his short stay in New York, Mr. George C. Stone and Mr. Louis D. Huntoon presented to him most informally the medal which was awarded him by the Mining and Metallurgical Society in January, 1916. It is with pleasure that the Secretary reports that Professor Kemp is improving, and that he hopes to return to his duties at Columbia in February, 1917.

New York Section.—The next meeting of the New York Section will be held at the Engineers' Club, on Thursday evening, December 21, preceded by a dinner at 6.30.

Erratum.—On page 236 of the last Bulletin, No. 101, a typographical error was made, question No. 31 having been entered erroneously after question 32 and the number being stated as 33.

MINING LAW REVISION.

The result of the referenda on mining law revision among the Mining and Metallurgical Society and the several state

societies was commented upon by the *Engineering and Mining Journal* as follows:

"With a few exceptions these organizations voted in the same way as the Mining and Metallurgical Society upon the main questions that have been summarized in this article. The California Metal Producers' Association by a vote of 5 to 4 declared in favor of limiting the number of locations. The Colorado Scientific Society is unwilling to see the requirement of discovery abolished, but desires that actual possession of a delimited claim be legalized pending bona fide effort to make discovery. Otherwise the differences among the several organizations relate mainly to details. In this connection it is interesting to call attention to the matter of size of claims, wherein are reflected differences of opinion arising from environment and experience. The Northwestern mining men are strongly in favor of a claim not less than 1,320 ft. square (40 acres). They have come most in contact with British Columbia practice, where the claim unit is 1,500x1,500 ft. The Colorado men are divided between large claims (40-acre maximum) and small ones (2½-acre minimum.) The Southwest men generally favor a small claim. They have had experience with the small *pertenencias* of Mexico.

"It is singularly gratifying that the general expression of opinion as to revision of the mining laws of the United States thus obtained through the medium of the Mining and Metallurgical Society has been so harmonious upon all main points. It ought not, with this information, to be difficult to proceed to draft for introduction in Congress a bill that will be what mining men want. The matter now stands in much the same way that it would if a commission had toured the United States and obtained oral expressions of opinions in several mining centers and tabulated them. The present expression of opinion is probably more representative, for it summarizes votes not merely from a few places but from many, scattered all over the United States, and moreover it follows a prolonged discussion—extending through several years—in the course of which all kinds of views have been advanced and considered.

"It will now naturally devolve upon some committee to consider the wishes of the mining industry and weld them into a properly phrased measure to be offered in Congress. Without any doubt the Mining and Metallurgical Society will proceed to take this next step with the same broad view that it has had in taking the previous ones; that is, assuming only the leadership in getting something done and inviting the co-operation of everybody interested. The purpose is manifestly to produce a "mining men's bill," embodying what mining men want. It is to be expected that whatever committee undertakes this will have adequate legal assistance, moreover that it will publish its proceedings as it goes along. This will not be altogether an untried experiment in framing legislation. The model bill drafted by the Committee on the Prevention of Accidents in Metal Mines (published in U. S. Bureau of Mines Bulletin No. 75), which has been enacted with trifling modifications by several mining states, is evidence of what a committee of engineers can do in such things."

COMMUNICATIONS.

F. F. Sharpless.—The Denver Commercial and Civic Association recently adopted some interesting resolutions which dis-

close the attitude of Colorado mining men towards the policy of handling the public lands. Inasmuch as these have some bearing on the matter of mining law revision, it will be well to reprint them in our Bulletin. These resolutions were adopted on November 9, and are as follows:

Whereas, the public domain in the eleven states situated to the west of Kansas comprises 471,000,000 acres of land, amounting to about 62 per cent. of these states, and the policy of the federal government as to the disposal and utilization of this area, and the natural resources therein contained is of vital importance to the people and the local governments of these eleven states; and,

Whereas, the basic principle of the so-called Ferris bills before Congress is the permanent retention of title to certain of the natural resources upon this public domain in the federal government, and this principle may, and we fear will, be extended to cover all of the natural resources and the land itself; and,

Whereas, under this principle, the future population occupying these lands and developing the resources thereupon cannot be other than a tenantry; and,

Whereas, the members of a desirable citizenry should possess the laudable ambition to become owners of those properties and industries to the development of which their lives and fortunes are devoted; and,

Whereas, only by the conversion of these lands and resources to private ownership can they be directly subjected to the taxing powers of the states, and made to contribute their fair proportion of the cost of the benefits of local government, and it is manifestly unfair that the states should forever bear the expense of local government over an area of which less than 40 per cent. is subject to their taxing powers; and,

Whereas, throughout the civilized world the impossibility of successfully establishing and maintaining a prosperous and contented population in districts where great tracts of the country are held in private ownership by one or a few owners has repeatedly been shown, and when the ownership of such great tracts of land is by an entity holding itself superior to and beyond the laws and customs of the community wherein the land is located, it is even more obnoxious; and,

Whereas, the claims of the federal government, already made, that easements over the public domain, for uses devoted entirely to the public service of the citizens of the state, can be acquired only upon compliance with conditions prescribed by the federal government are inherently antagonistic to the power of this state to enforce its own policies with respect to its own internal development, in accordance with its own eminent domain; and,

Whereas, the plan to retain ownership in these resources, and permit their utilization only upon a leasing basis, has heretofore on several occasions unsuccessfully been attempted by the federal government and resulted in each instance in almost complete cessation of development of such resources;

Therefore, Be It Resolved, that this association is squarely opposed to any policy with respect to the public domain designed to retain perpetually in the federal government title to these lands and their resources, and can only support a policy whereby the title to these lands

and resources ultimately will pass to those who devote their lives and efforts to the conversion of these resources from the mere potentialties which they now are into actual factors of production of the wealth of the country; and,

Be It Further Resolved, that while this association does not at this time say that there should be no change in the terms and conditions upon which the federal government shall convey these lands and resources to the people, and will not oppose such change in the existing laws and departmental regulations as may reasonably assure to the government a fair compensation and the actual and proper development and utilization of these lands and resources within a reasonable time, we desire nevertheless to point out, with emphasis, that the cost of these lands to the United States was, on the average, considerably less than 50 cents per acre thereof, with no further consideration for deposits of oils and minerals, growths of timber, water power sites and other so-called resources; and we also desire to point out that any increment in the value of these lands and resources is largely the result of economic and industrial growth of the territory within which this public domain is located, and that this growth has been brought about by the citizens of these Western states and the hardships, efforts and risks that they and their forebears have undergone in removing their homes and activities from the more settled districts in the Eastern states to a new and strange country, and we cannot believe the people of the Eastern states can mean by their support of the so-called conservation movement now consciously to deny to the people of the Western states the benefits of successful pioneering and colonization.

Be It Further Resolved, that we are firmly of the opinion that, in denying to the Western states the right to develop these lands and resources, to settle thereupon a prosperous and contented community of property owners, the federal government denies us our constitutional right of equality in all respects with the older states forming part of that government.

COUNCIL.

Meeting of November 6, 1916.

A meeting of the Council of the Mining and Metallurgical Society of America was held at the Lawyers' Club, New York, on November 6, at 12.30 p. m. The meeting was called to order by the President, Mr. J. R. Finlay. Those present were: Messrs. Finlay, Lindgren, Dwight, Ingalls, Jennings, Stone, Penrose and Huntoon, a total of eight, this constituting a quorum.

A copy of the minutes of the previous meeting having been sent to each member of the Council, were approved as thus submitted.

New Members.—The Secretary reported that he had canvassed ballot No. 62 on August 2. Fourteen votes were received; all in the affirmative, and the following were therefore elected members and duly notified: Charles V. Drew, Frederick Keffer, John Roger and Knox Taylor. Ballot No. 63 was canvassed on

October 2. Fourteen votes were received, all in the affirmative, and Mr. Frank H. Probert was elected and duly notified.

Annual Medal.—The Secretary was instructed to interview Mrs. James F. Kemp on her arrival in New York and accept her suggestions regarding the medal awarded Professor Kemp in January, 1916, which has not been presented, due to the illness of Professor Kemp.

The Secretary was unable to report the names suggested for the award of the 1917 medal, as the names suggested had not been tabulated.

Due to the illness of Professor Kemp, the President appointed Mr. F. F. Sharpless a member of the Annual Medal Committee, to take the place of Professor Kemp, and instructed the Secretary to advise Mr. Sharpless of his appointment.

Nominations for Officers.—A report of the ballots for the nominations of officers of the Society for 1917 was submitted. The total votes cast were: 61 for President; 54 for Vice-President; 62 for Secretary-Treasurer, and 51 for Councillors. Mr. Finlay received the requisite number of votes for President, but declined to accept. W. R. Ingalls, Hennen Jennings, Seeley W. Mudd and H. V. Winchell received the next highest number of votes. Mr. Jennings declined to accept the nomination, and the Secretary was instructed to include the following names on the ballot: For President, W. R. Ingalls, Seeley W. Mudd and H. V. Winchell; for Vice-President, Waldemar Lindgren was the only member receiving the requisite number of votes, and the Secretary was instructed to place his name on the ballot for Vice-President. For Secretary-Treasurer, Louis D. Huntoon was the only member receiving the requisite number of votes, and the Secretary was instructed to place his name on the ballot for Secretary-Treasurer. For Councillors, the Secretary was instructed to place the following names on the ballot:

District 1, 2, 3, 4.—W. H. Aldridge, J. Parke Channing, J. H. Janeway and A. L. Walker.

District 6.—R. M. Catlin, Joseph Hyde Pratt and George Otis Smith.

District 7.—E. B. Kirby.

District 9, 10.—E. H. Benjamin, Albert Burch and F. H. Probert.

District 12.—Stanly A. Easton and Reno H. Sales.

Mining Law Revision.—Mr. Ingalls, Vice-Chairman of the Committee on Mining Law, submitted the report of the tellers on the ballot issued to the members of the Society on October

2. One hundred and twenty-three replies were received. The detailed report was printed in bulletin 101.

It was recommended and unanimously carried that the report as submitted by the tellers and presented by Mr. Ingalls be declared the action of the Society.

In the discussion which followed, Mr. Hennen Jennings suggested that the leasing of mineral lands by the Government should be carefully considered by the Mining Law Committee before drafting a new mining law. This point was discussed at length.

A second point discussed at length was the most practical method of drafting a new mining law bill. Mr. Ingalls finally recommended, and it was unanimously carried, that the Committee on Mining Law of the Mining and Metallurgical Society be instructed to invite the co-operation of the United States Bureau of Mines in the drafting of a bill revising the mining laws, to be introduced into Congress.

American Mining Congress.—The Secretary was instructed to invite one of our members to represent the Mining and Metallurgical Society of America at the convention of the American Mining Congress, to be held at Chicago the week of November 13th.

The meeting then adjourned.

LOUIS D. HUNTOON.
Secretary.

MEETINGS OF SECTIONS.

NEW YORK.

Meeting of November 16, 1916.

The New York Section of the Mining and Metallurgical Society of America held its regular meeting on November 16 at the Engineers' Club, New York City. After an informal dinner at which M. B. Spaulding presided, there was a discussion of electric furnace practice, introduced by a talk by C. E. vom Baur on the Rennerfelt furnace. The following members and guests were present: F. C. Alsdorf, J. Parke Channing, E. L. Dufourcq, L. D. Huntoon, W. R. Ingalls, F. E. Johnson, Jr., T. H. Leggett, J. V. Lewis, D. M. Liddell, F. E. Pierce, F. F. Sharpless, M. B. Spaulding, John Skogmark, Bradley Stoughton, C. E. vom Baur, A. L. Walker and E. C. Wood.

PERSONALS.

H. C. Bellinger has been appointed general manager at Chuquicamata for the Chile Exploration Co.

Dr. F. C. Cottrell, chief metallurgist of the Bureau of Mines, has been in Butte, Mont., in conference with Dr. L. D. Ricketts. They went over the recently drafted report of the Anaconda Smelter Board. Dr. Cottrell is expected to return to Washington on December 8.

J. R. Finlay is in Arizona on professional business.

Herbert W. Gepp, general manager of the Amalgamated Zinc Co. of Australia, sailed for Australia, where he expects to remain until next spring.

Dorsey A. Lyon is in charge of work being done by the Bureau of Mines in co-operation with the University of Utah. Mr. Lyon recently visited New York and Washington.

George S. Rice, chief mining engineer of the U. S. Bureau of Mines, has been in San Francisco, arranging for a successor to Edwin Higgins, representative of the Bureau of Mines in the California Industrial Commission. On his return he will visit certain mining centers where field investigations are in progress.

Dr. George Otis Smith, director of the Geological Survey, will speak on "Geology and Public Service" at the December meeting of the Geological Society of America, which is to be held at Albany.

OBITUARY.

Frederick James Hamilton Merrill, State Geologist of New York from 1899 to 1904, died from a stroke of paralysis on Wednesday, November 20, in Los Angeles. Since going to California, in 1904, Mr. Merrill had been engaged in private practice as a mining geologist. For three years he had been field assistant in the California State Mining Bureau.

He was born in New York on April 30, 1861, and was graduated from the Columbia School of Mines in 1885, receiving the degree of Ph.D. five years later. From his graduation until 1889 he was assistant in the Geological Survey of New Jersey. In 1890 he entered the service of New York as assistant director of the State Museum, becoming director four years later and holding the position ten years.

At the World's Fair at Chicago in 1893 he was director of the State's scientific exhibit, performing the same duty later at

Buffalo and St. Louis. He was a Fellow of the American Association for the Advancement of Science, the Geological Society of America and the Academy of Sciences and a member of the American Institute of Mining Engineers, and the Mining and Metallurgical Society of America.

In 1887 he married Winifred Edgerton, who survives him with four children, Louise, Hamilton, Winifred and Edgerton. The funeral was held on Wednesday, December 6th in Trinity Church, New York.

Mining and Metallurgical Society
of America

Vol. IX December 31, 1916 No. 12

COMMUNICATIONS.

METALLIFEROUS MINERALS ON INDIAN RESERVATIONS.

Hon. Carl Hayden.[1]—In compliance with my promise to keep you advised as to the progress of my bill to authorize mining for metalliferous minerals on Indian reservations, which passed the House on September 4, I am glad to say that on Dec. 16 this measure was favorably reported to the Senate by Senator Ashurst, Chairman of the Committee on Indian Affairs. The Committee recommended amendments to the bill providing that springs and other bodies of water cannot be located as mining claims; that damages shall be paid for injury to the land or improvements of any Indian; and that no timber shall be cut without permission. Competent Indians are also given the right to locate mining claims, and other Indians may do so after obtaining permission from the Department.

As the bill stands it will not go into effect until after the Secretary of the Interior designates the reservations or parts of reservations that shall be open to mining. In other words, the law shall be inoperative until after the Secretary declares which lands shall be opened to the prospector. No doubt the Secretary will do this at an early date after the bill passes.

The western Senators all seem to be greatly interested in the bill and I am sure that they will see that it comes to a vote in the Senate before very long. It is a much less liberal measure than the bill which I first introduced, but the friends of the Indians are so fearful that some injustice will be done to them that they insist upon the adoption of these restrictive amendments. I shall promptly notify you whenever this bill becomes a law.

December 19, 1916.

Mr. Hayden's bill, as amended, reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That the Secretary of the Interior be, and hereby is, authorized and empowered, under general

[1] Member of Congress from Arizona.

regulations to be fixed by him and under such terms and conditions as he may prescribe, not inconsistent with the terms of this Act, to lease to citizens of the United States or to any association of such persons or to any corporation organized under the laws of the United States or of any State or Territory thereof, any part of the unallotted lands within any Indian reservation heretofore withdrawn from entry under the mining laws for the purpose of mining for deposits of gold, silver, copper, and other valuable metalliferous minerals, which leases shall be irrevocable, except as herein provided, but which may be declared null and void upon breach of any of their terms.

Sec. 2.—That after the passage and approval of this Act, unallotted lands within Indian reservations heretofore withheld from disposition under the mining laws may be declared by the Secretary of the Interior to be subject to exploration for and discovery of deposits of gold, silver, copper, and other valuable metalliferous minerals by citizens of the United States, and after such declaration mining claims may be located by such citizens in the same manner as mining claims are located under the mining laws of the United States:

Provided, That the locators of all such mining claims, or their heirs, successors, or assigns, shall have a preference right to apply to the Secretary of the Interior for a lease, under the terms and conditions of this Act, within one year after the date of the location of any mining claim, and any such locator who shall fail to apply for a lease within one year from the date of location shall forfeit all rights to such mining claim:

Provided further, That duplicate copies of the location notice shall be filed within sixty days with the superintendent in charge of the reservation on which the mining claim is located, and that application for a lease under this Act may be filed with such superintendent for transmission through official channels to the Secretary of the Interior; and

Provided further, That lands containing springs, water holes, or other bodies of water needed or used by the Indians for watering live stock, irrigation, or water-power purposes shall not be designated by the Secretary of the Interior as subject to entry under this Act.

Sec. 3.—That leases under this Act shall be for a period of thirty years, with the preferential right in the lessee to renew the same for successive periods of ten years upon such reasonable terms and conditions as may be prescribed by the Secretary of the Interior, unless otherwise provided by law at the time of the expiration of such periods:

Provided, That the lessee may, in the discretion of the Secretary, be permitted at any time to make written relinquishment of all rights under such a lease and upon acceptance thereof be thereby relieved of all future obligations under said lease.

Sec. 4.—That in addition to areas of mineral land to be included in leases under this Act the Secretary of the Interior, in his discretion, may grant to the lessee the right to use, during the life of the lease, a tract of unoccupied land, not exceeding eighty acres in area, for camp sites, milling, smelting and refining works, and for other purposes connected with and necessary to the proper development and use of the deposits covered by the lease.

Sec. 5.—That the Secretary of the Interior, in his discretion, in making any lease under this Act, may reserve to the United States the right to lease, sell, or otherwise dispose of the surface of the lands embraced within such lease under existing law or laws hereafter enacted, in so far as said surface is not necessary for use of the lessee in extracting and removing the deposits therein:

Provided, That the said Secretary, during the life of the lease, is

hereby authorized to issue such permits for easements herein provided to be reserved.

Sec. 6—That any successor in interest or assignee of any lease granted under this Act, whether by voluntary transfer, judicial sale, foreclosure sale, or otherwise, shall be subject to all conditions of the approval under which such rights are held and also subject to all the provisions and conditions of this Act to the same extent as though such successor or assign were the original lessee hereunder.

Sec. 7.—That any lease granted under this Act may be forfeited and canceled by appropriate proceedings in the United States district court for the district in which said property or some part thereof is situated whenever the lessee, after reasonable notice in writing, as prescribed in the lease, shall fail to comply with the terms of this Act or with such conditions not inconsistent herewith as may be specifically recited in the lease.

Sec. 8—That for the privilege of mining or extracting the mineral deposits in the ground covered by the lease the lessee shall pay to the United States, for the benefit of the Indians, a royalty which shall not be less than five per centum of the gross value of the output of the minerals at the mine, due and payable at the end of each month succeeding that of the extraction of the minerals from the mine, and an annual rental, payable at the date of such lease and annually thereafter on the area covered by such lease, at the rate of 25 cents per acre for the first calendar year thereafter; 50 cents per acre for the second, third, fourth, and fifth years, respectively; and $1 per acre for each and every year thereafter during the continuance of the lease, except that such rental for any year shall be credited against the royalties as they accrue for that year.

Sec. 9.—That in addition to the payment of the royalties and rentals as herein provided the lessee shall expend annually not less than $100 in development work for each mining claim located or leased in the same manner as an annual expenditure for labor or improvements is required to be made under the mining laws of the United States:

Provided, That the lessee shall also agree to pay all damages occasioned by reason of his mining operations to the land or allotment of any Indian or to the crops or improvements thereon; and

Provided further, That no timber shall be cut upon the reservation by the lessee except after first obtaining a permit from the superintendent of the reservation and upon payment of the fair value thereof.

Sec. 10.—That the Secretary of the Interior is hereby authorized to examine the books and accounts of lessees, and to require them to submit statements, representations, or reports, including information as to the cost of mining, all of which statements, representations, or reports so required shall be upon oath, unless otherwise specified, and in such form and upon such blanks as the Secretary of the Interior may require; and any person making any false statement, representation, or report under oath shall be subject to punishment as for perjury.

Sec. 11.—That all moneys received from royalties and rentals under the provisions of this Act shall be deposited in the Treasury of the United States to the credit of the Indians belonging and having tribal rights on the reservation where the leased land is located, which moneys shall be at all times subject to appropriation by Congress for their education, support, and civilization.

Sec. 12.—That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations not in-

consistent with this Act as may be necessary and proper for the protection of the interests of the Indians and for the purpose of carrying the provisions of this Act into full force and effect:

Provided, That nothing in this Act shall be construed or held to affect the right of the State or other local authority to exercise any rights which they may have to levy and collect taxes upon improvements, output of mines, or other rights, property, or assets of any lessee.

Sec. 13.—That mining locations, under the terms of this Act, may be made on unallotted lands within Indian reservations by Indians who have heretofore or may hereafter be declared by the Secretary of the Interior to be competent to manage their own affairs; and the said Secretary is hereby authorized and empowered to lease such lands to such Indians in accordance with the provisions of this Act:

Provided, That the Secretary of the Interior be, and he is hereby, authorized to permit other Indians to make locations, and obtain leases under the provisions of this Act, under such rules and regulations as he may prescribe in regard to the working, developing, disposition and selling of the products, and the disposition of the proceeds thereof of any such mine by such Indians.

Sec. 14.—That the provisions of this Act shall not apply to the Five Civilized Tribes and Osage Nation of Indians in Oklahoma.

REVISION OF THE MINING LAW.

Idaho Mining Association.

The Idaho Mining Association has issued to its members, and to mining men and prospectors generally, the following notice:

You have been mailed Bulletin No. 101 of the Mining and Metallurgical Society of America, in which is enclosed a ballot that sets forth 33 questions relating to the revision of the Federal mining law. You will oblige us by writing "Yes" or "No" opposite each question on the ballot, and we will appreciate your mailing ballot to us on or before Jan. 13, 1917, as the ballots are to be canvassed at our fourth annual meeting Jan. 16 and 17, 1917. It is your duty to accept this opportunity to give expression to your opinion concerning revision of the Federal mining law, and you should write us fully on the subject.

The Secretary of the Idaho Mining Association has sent us the following clipping from *The Idaho Statesman,* Dec. 31, 1916:

The question of the revision of the Federal mining laws has been under consideration by the mining associations of the United States for several years, and a convention of delegates from these associations was held in Washington, D. C., December 16, 1916, under the auspices of the Mining and Metallurgical Society of America, to consider this subject.

The Mining and Metallurgical Society of America, the Northwestern Mining Association, the Nevada Mining Operators' Association and the California Metal Producers' Association have gone on record favoring certain changes in the law, and the Idaho Mining Association, at its third annual meeting, held last January, adopted a resolution to the effect that the codification and revision of the Federal mining law is a long-delayed necessity and now confronts the mining industry of the nation as the paramount factor in constructive legislation for its upbuilding and conservation. The Mining and Metallurgical Society, the foremost mining society of the world, of which J. R. Finlay of New York, an eminent

mining engineer, is president, has been active in inducing the other mining associations of the United States to interest their members in the subject of revision.

About 800 men in Idaho actively engaged in mining, whose names were furnished by the Idaho Mining Association—large operators, small operators, claim owners and prospectors—have had mailed to them by this society its bulletin No. 101, in which is enclosed a ballot that sets forth 33 questions relating to the revision of the Federal mining law, and the bulletin contains explanatory matter referring to these questions.

This society and the Idaho Mining Association have requested the mining men that will receive the bulletins and ballots to write "Yes" or "No" opposite each question on the ballot and mail the ballots to the association on or before Jan. 13 next, as the ballots are to be canvassed at the association's fourth annual meeting, to be held in Boise on Jan. 16 and 17 next.

Some of the changes involved in these questions provide for a radical departure from our present mining law, as will be seen by the following:

"Shall the law of extralateral rights be abolished and mining claims hereafter located square and consist of from 10 to 40 acres, bounded by vertical planes passing through surface boundaries without the right to follow any valuable mineral deposit beyond such planes?"

"Shall it be provided that an equivalent sum of money be paid into the United States land office in lieu of the performance of assessment work?"—a question of exceeding interest to prospectors, mining men point out, for such a provision would deprive them of the money they now obtain from performing assessment work on claims.

"Shall the new mining law be made to cover all classes of valuable mineral deposits other than coal?" and "Shall actual discovery of a valuable mineral deposit be necessary to a valid location of a claim?"

Another important question is: "Shall the locator of a claim be compelled to patent within a period of seven years from the date of location or otherwise lose title to the claim?"

The association points out that the subject of revision is one of extreme importance to the men engaged in the mining industry and that it is the duty of every man receiving the bulletin and ballot to express his views by a "Yes" or "No" answer.

The objection has been made by one of the prominent mining publications that the subject of revision has been mainly in the hands of the large operators and mining engineers, but in the referendum vote to be taken in Idaho all classes of mining men will have the matter under consideration.

MEETINGS OF SECTIONS.

NEW YORK.

The New York section held its usual monthly dinner and meeting at the Engineers' Club, on Thursday, Dec. 21. The following members and guests were present: H. H. Alexander, F. C. Alsdorf, R. M. Ball, Sydney Ball, P. E. Barbour, J. Parke Channing, J. A. Church, Jr., C. R. Corning, C. R. Davis, T. F. Donnelly, J. V. N. Dorr, Walter Douglas, C. V. Drew, H. W. Dubois, Ernst Eurich, J. R. Finlay, H. W. Hardinge, W. R. Ingalls, S. J. Jennings, D. M. Liddell, L. W. Mayer, W. W.

Mein, Robert Peele, F. E. Pierce, F. R. Pyne, R. M. Raymond, A. H. Rogers, John Roger, E. M. Rogers, F. F. Sharpless, R. A. Shailer, E. G. Spilsbury, H. H. Stout, John Skogmark, A. M. Smoot, Judd Stewart, M. B. Spaulding, G. C. Stone, and H. W. Webb.

The Chairman.—It certainly is a great pleasure to see so many here tonight. I do not suppose I need to offer any introduction of those who are to speak. For the benefit of our guests, who possibly are not informed, I will announce that the question is "How and why do present conditions affect the cost of mining, smelting and milling?" I think the subject of readjustment is also of very live interest to all of us, and it is doubly so in view of what may happen when peace is restored. The question of miners' wages and cost of supplies is very important.

Mr. Jennings.—I had hoped to be one of the last to speak when you would all be so tired that I could make my remarks very brief, but being called upon first to speak on what the present situation has done towards increasing the cost of mining, I will put forward some views that have appealed to me in the last few months. The mining of ore in the United States is done almost entirely by foreigners. In the mines with which I am connected, 27 different nationalities are represented. In some mines, especially copper mines, Spaniards are in the majority; in others, Finns predominate for running rock drills, while shoveling and pushing cars is done largely by Austrians, work on the surface being done mostly by Greeks.

The breaking out of the war called to the armies of the different nations those, at least, who were sufficiently patriotic to want to be called. There are still undoubtedly a number of foreigners working in this country who, during the past two and a half or three years, have accumulated large sums of money. They do not spend much, their families are not here, and consequently they accumulate money. The wages in the mines with which I am connected have been advanced in order to keep up with what we might call the scale advance, that is, in proportion to the price of copper, so that wages paid to miners are now about 60 per cent. higher than they were three years ago. As wages constitute approximately two-thirds the cost of mining, you can see that the actual cost of mining has increased very largely from that factor alone.

The price of all supplies, owing to the insistent demand for materials which enter into the manufacture of explosives, fuse, and all machinery, has increased very largely. For the first year and a half of the war, our supplies were delivered to us on

contracts which had been made before the war broke out, and the increase in their cost was not felt by the mining companies until the expiration of those contracts. At the present time, I should say, the cost of supplies has certainly advanced as much as the cost of labor. Now, that increase has occurred not only in the cost of mining, but in all industries, and the miner now has to pay, for his food and clothing and rent and transportation, an increase proportionate to his increased wages; but of course his capacity for saving has likewise increased in proportion, so that all his increased wages have not been consumed by the increased cost to him. Taking a very broad view of the situation, it appears to me that the United States has financed a rise in price of all commodities, including labor, and that this prosperity, which is so apparent at present, will probably not remain with us, because the reducing of the price of all things will be accomplished with so much greater difficulty than the raising was accomplished, the wealth accumulated in this period of prosperity will be absorbed in that period of depression. It will need our best effort and our most careful study how to economize in the use of labor, especially, and in consumption of supplies, if we wish to retain in this country some of the prosperity which has been so apparent in the past two years.

Geo. C. Stone.—I think that we zinc men have been some of the worst sufferers (laughter) in the last two years. There have been compensations sufficient to make up for the large increase in labor costs, but aside from this we have suffered severely from the scarcity of skilled furnacemen. Good spelter men are always scarce, and when the smelting capacity of the country was doubled in a very short time, the lack of experienced men was severely felt. Owing to the shortage, they could get practically what they asked for and they asked frequently. We found considerable difference in the amount of trouble involved in obtaining suitable men in different parts of the country, depending on the proximity of other smelters. The southwest, where the works are numerous, close together, and were rapidly increasing their capacity, was the worst point. The Mississippi valley, where there are fewer works and less expansion, was not so bad, and in the east, where there are no other spelter works, our only trouble was due to the general shortage of labor.

The scarcity of skilled labor has been a much more serious matter than high wages, the latter being compensated for by the high price of the product. Spelter furnacemen, like poets, are largely born and not made, and the presence of a large proportion of men who do not know their business tends generally to poor work, both in recoveries and in quality of the product.

Owing to the shortage, the men were very independent and it has been impossible to enforce discipline. The men did not care if they were discharged as they knew they could go to the next works and get an equally good job at the same pay. It is impossible to state in dollars and cents the loss through poor and careless work, but it is very large and is likely to continue for some time after the conditions that have caused it are removed. It is much easier for the men to do things in a careless way which causes losses in recoveries and quality, and it will take a long period of hard times to make them again take proper care. The success of spelter work depends more on the individual care and skill of the men than in almost any other branch of metallurgy, which is my reason for saying that we have suffered more than others.

Mr. H. H. Alexander.—Not being very good at remembering figures, I have jotted down some notes on the advance in costs. In common with other metallurgical operations, lead refining has had to stand heavy increases in price for all items entering into the cost of operations. The increased cost may be divided into two classes: increased cost of labor, and higher prices for supplies and material.

During the period under consideration, labor has been given increases varying from 20 to 50 per cent., common labor getting the greater amount. Usually when such increases have been made, there has been more or less increase in the amount of labor performed. I think it has been the usual experience that where wages has been increased there has been a corresponding improvement in performance; but this has not been the case in this instance. On the contrary, there has been a decided falling off in the amount of work done. Without attempting to explain this condition, the fact remains that the employers of common labor have found it to exist, thus making it an important factor of cost. Our experience with common labor shows a decrease in efficiency of between 25 per cent. and 30 per cent. As 40 per cent. of the cost of labor in lead refining comes under this classification, it makes the expense more than the increase would indicate. This criticism does not apply to the steady labor, furnacemen, helpers, and that class, who have been long on that particular job. They are doing as much work as ever.

Another factor which adds to costs is a shortage of labor. We estimate the supply at somewhere around 80 per cent. in our vicinity. That is, if each employer had all the labor he desired to do his work, we would absorb 20 per cent. more than we have. This means that something is left undone and has to be done

when you can get around to it, which naturally increases cost all along the line.

The second cause of increase has been due to the higher prices for material. This can be shown best by the following list of the increases; I made it up a week ago and it may not be correct now. (Laughter.)

Material	Comparative Increase
Firebrick	50%
Common Brick	30%
Magnesite Brick	300%
Iron	45%
Steel	80%
Castings	45%
Crucibles	135%
Retorts	265%
Nitric Acid	35%
Sulphuric Acid	30%
Zinc	170%

In the softening, cupelling, and refining processes themselves, there are no particular items other than those previously mentioned which have risen in cost, except fuel. The desilverizing operation has been hit particularly hard by the advance in the price of zinc—an increase from 6c. to 20c. during this period. Even the present price of 13c. means a heavy burden on the cost of refining. There is a fixed loss of between 12 and 13 lb. of zinc per ton of lead, through saturation, which is lost in the refining.

Moreover, the cost of kettles has followed the upward trend of iron and steel prices. Retorting has gone up. Retorts made of American clay cost over three times as much as those formerly in use, made of foreign clay, and do not show the same length of life. This disadvantage of short life is being improved and we have no doubt that eventually we shall obtain as long life from the American article as formerly from the imported one. At one time we contracted for all retorts on a given life, and if a retort did not last that long a certain deduction was made. The last retorts we got are lasting about 75 per cent. as long as old retorts, but they are improving right along. The bags now being used cost 100 per cent. more and are not so durable as those formerly obtained for half the price.

The higher cost of operating reverberatories has been due to the higher cost of common labor. The transfer of material to and from these furnaces is done by this common labor, which has received the increase.

Summarizing the various increases in cost, the expense of lead refining to-day is 50 per cent. more than formerly.

Mr. F. R. Pyne.—In connection with copper refining, we

have likewise suffered a large increase in the cost of operation. Before this war in Europe started, everything was running along very nicely, then it broke loose, and inasmuch as Germany and Austria consumed a large part of our production, it seemed wise to the producers of this country to cut the production approximately in half, so that in a very few months the refineries were pretty desolate looking places. The ore trade with the west coast of South America went all to pot, largely on account of the monetary situation. Then the tremendous demand for copper by the munition makers started and everybody began to ship to the refineries everything resembling copper. Although it had never been thought possible that the smelters could overship, the plants very soon began to resemble large stockyards. Everybody had copper and ore piled up. So we immediately decided to enlarge, but when it came to letting the contracts we couldn't get any deliveries under six to nine months, but we are finally getting out of this hole and pretty soon we hope to have the situation in hand. The accumulation of these stocks has resulted, naturally, in a tremendous interest charge, then labor, which, as has been said, has advanced anywhere from 30 to 60 per cent. in price and lowered 20 to 30 and 40 per cent. in efficiency, has also boosted costs sky-high In fact, I could say where formerly we could get a piece of work done with a thousand hours of work, it now takes twelve or thirteen hundred to get the same thing done. That occurs in handling, more than anything else. The men on the furnace are still doing their job about as they did, although one remarked, when we were trying to speed him up, that this is 1916 and not 1914, and if we didn't like it he'd go next door and get another job.

The price of supplies has gone kiting, as a natural consequence of the labor situation, and there is a marked falling off in the quality of the materials. One case I have particularly in mind is that of refractory material. It has not only gone away up in price, magnesite and chrome brick going up 300 per cent., and not to be had, but the quality of silica brick and clay brick has absolutely gone to pieces, resulting in additional furnace repairs, and loss of production from having to shut down the furnaces more often than in the past.

A very big factor in the rising cost is the tremendous increase in the value of metal losses. These have been reduced in past years to a very low figure; we were gradually getting them lower and lower as years went by; but when the price of copper is doubled and the price of silver increased by 50 per cent., you can see that the value of your metal losses has gone away

up in X, without any prospect of its coming down until prices fall.

Another thing that has helped to increase costs is the transportation situation. The railroad gives you cars if it feels like it; if it doesn't feel like it you don't get them, and that necessitates putting copper into stock and taking it out again, where formerly you put it directly into cars. The question of lighterage is similar, and at times you can not get barges at all. Also, the frequent embargoes that the railroads have placed have disorganized things to a greater or less extent.

With conditions as they are at present, I do not think the demands for labor are satisfied. In fact, raises seem to be coming along as a regular performance, and I imagine they will continue for the months to come. Most of the refineries here employ Hungarians, Poles, Austrians and other Europeans, a great many of whom, I understand, have signified their intention of going back to their countries when peace is declared, to see what has happened over there. I see by the papers that a great many of the steamship companies have been flooded with applications for reservations on the first steamship leaving for Europe. If they are going to leave in such great numbers as is indicated, it does not look as though the labor situation were going to improve, and I expect that we shall be faced with high costs for a long time to come.

Mr. Walter Douglas.—I have tried to prepare some figures that might be regarded as comparative and would show the effect of increase in wages and supplies on the cost of copper, but I confess that I have not been successful. The conditions surrounding our operations have been so abnormal during the last three years that the result of my investigation has been extremely unsuccessful. We are operating four producing properties, three in the United States and one in Mexico, and I have been unable to reconcile the operations this year with those of 1914 and 1915 so as to arrive at any comparisons that might be regarded as of interest.

In the case of Bisbee, where we have what is called a "white camp," that is we employ American or Northern European labor underground exclusively, our wages in 1916 have increased over the 1914 scale by 48 per cent., the average wages paid underground in 1915 having been $5.35, while wages for the present month (Dec., 1916), based on the price of copper for the month of November, is $6.12 for miners. We are, and have been for two years past, operating on a sliding scale. We take 14c. copper as the base rate, and on that base the miner receives $3.75

per day, and the mucker and mule $3.50. For each cent increase in the price of copper wages rise 12½c. per day, so that our increase in wages in 1915 was 13 per cent. over 1914, and 48 per cent. in 1916.

Strangely enough, our costs have not increased in anything like the proportion that would be expected by these additional wages. Probably this is due to an improvement in efficiency and to a very small reduction in overhead, through increased production. We show little or no marked increase per ton of ore in the cost of supplies, which may be ascribed largely to the main items which enter into such an account and which were contracted for prior to the war and cover a period of years. This is especially true as to fuel, and largely as to mine timber, etc. Explosives, of course, have increased greatly in price.

When we consider the Morenci district, where we work Mexicans, Spaniards and Italians underground, we encounter a condition which forbids comparison. We were there tied up with a strike from August, 1915 to March, 1916, and after resuming operations we had the mines to pump out and the concentrator and smelters to overhaul, so that with such extraordinary expenses all comparisons are vitiated. Here, our wages scale has increased 70 per cent. over that in force in 1914; the average wages of the underground man for 1916 has been $4.15, and the December wages will approximate $4.60.

In our Mexican mines, again, comparisons are impossible. We there carry an additional burden, due to the high selling price of copper, in that, in order to meet the extraordinary expenses of maintaining the present army in Mexico, the Carranza Government has enforced a very high export tax, varying according to the selling price of the metal. This tax, which is in addition to any other tax paid before, amounts at present to about 2.6c. (gold) per pound of copper. The concession under which we operate provides that we shall be permitted to export copper free of all duties, although we are required to pay taxes on the export of precious metals. The cost of labor has also increased enormously, as the State Government requires that wages be now paid in silver, as it was found impossible to induce the Mexican laborers to accept the depreciated paper currency of the country. We have also been required, by decree, to put all classes of labor on an eight-hour day basis, which has likewise increased operating costs. In view of these conditions, therefore, it is obvious that comparative costs, as shown by figures available, mean absolutely nothing as variations can only be partly ascribed to increases in the costs of labor and material.

The Chairman.—Mr. Jennings, may I ask, in connection with

the Mexican situation, have you had much trouble recently about your operations in Mexico?

Mr. Jennings.—In Pachuca we have operated continuously during all this period, on more or less of a scale. In April, 1914, we took out all our American employes in Pachuca, and left the mines in charge of one of our Mexican officials, together with two Englishmen. During that period the pumps were kept working and development was carried on; one of the mills was run for the whole period and part of the time two of the mills were run, so that actually the expenses were met by the product of the mine. Then our American managers returned in October of that year and during 1915 we operated with difficulty, mainly in obtaining supplies such as cyanide and dynamite. Every once in a while you would get into difficulty with the American government while exporting dynamite to Mexico, and of course there were times when the Mexican factory couldn't supply you with any dynamite at all because it was in possession of the opposing faction.

Pachuca has been under Carranza most of the time since he has obtained the upper hand in Mexico. In June of this year all our Americans came out, leaving the property in the hands of two Englishmen; one mill has been operating continuously with the exception of about six weeks when we had no cyanide.

The difficulty has become acute in the last six weeks or two months, from the fact that there is no circulating medium to pay our men or to pay for our supplies. Mexican laborers absolutely refuse to accept paper money of any kind. The Carranza government passed a decree that you should pay 50 per cent. of the wages in paper and 50 per cent. in metallic currency, at the normal rate of wages which prevailed before the outbreak of revolution—"stated in terms of Mexican gold." When the laborers realized that they were getting only 50 per cent. of their former rate of wages in metallic currency, and the balance in something that wasn't worth anything, they struck and started rioting, about a thousand shots being exchanged between the guards and the rioting laborers. It was explained to the men by the Government officials that that was the decree and that the company could not pay differently, although we were willing to do so. Then when it was learned also that the stores would have to accept payment for their goods half in metallic currency and half in paper money of no value, the workmen quieted down, but until you can get some form of circulating medium that the people can accept you are going to have trouble.

One of the difficulties that confront the Mexican govern-

ment, of course, is the fact that a Mexican dollar (peso), considered as bullion, is worth 59c., instead of 50c. as is stamped on it. In other words, when you coin a peso you take 59c. worth of silver, put it through a mint, make a coin and stamp it, and it loses 9c. in value. Now, no government, however rich, can continue that practice for an indefinite period of time. The Mexican Government, in order to get around the difficulty to some extent, created a half dollar which is 800 fine, but even that, at present price, is worth slightly more as bullion than it is as a half-peso; some financier will have to get up a scheme for a circulating medium that will be effective, which will be satisfactory to the laborer, and will not cost the Government too much.

The question of obtaining supplies in Mexico, especially cyanide, is an extremely difficult one. The sources of cyanide previous to the outbreak of the European war were Germany and England. The source of German supply is absolutely cut off and the English supply is completely absorbed by the English companies in South Africa and Canada. All other raw material that would go to make cyanide is utilized for the manufacture of powder. In the United States, they have started a plant to make sodium cyanide, but great difficulties have been encountered because the firm has been placed on the blacklist of the English Government, and consequently cannot get power from Canada, and is deprived of a lot of things. An American company has recently started manufacturing cyanimide, which contains the equivalent of 20 per cent. of potassium cyanide, and the officials think they can manufacture that at such a price, including freight, that we can afford to use it. Experiments have been made, which show that the percentage of carbon in it is not detrimental, because when it is dissolved the carbon settles to the bottom, and after filtering you have a solution which is as efficient in the dissolving of silver and gold as potassium cyanide. Dynamite, of course, is one of those supplies with which you have continual difficulty. We have solved that by operating two special trains, the locomotives and cars of which we have borrowed from American railroads and bonded, which we run to our works in Pachuca, and they are returned with the same engines, crews and cars to the United States.

Eli T. Conner (Communication).—Pertaining to the subject of the increased costs, I have observed that in my work of the past two years in remodeling anthracite coal breakers, enlargement of power plants, installation of pumping equipment, etc., "recent conditions" have increased the cost of all improvements such as mentioned about 65 to 79 per cent. over the costs of 1915, and about 90 per cent. above similar installations in 1914. Not

only has material of all kinds greatly advanced in price, but labor also has gone up and the work day has been reduced from nine to eight hours. The general efficiency of working forces has decreased more than one hour per day.

Mr. J. Parke Channing.—The only property which I am actively operating is the Miami Copper Co., and the conditions are very similar to those represented to you by Mr. Douglas. Our labor is on practically the same scale, except that at 14c. copper our base is $3.50 and advances 12½c. for each cent increase in the price of copper, so that at present we are paying about $5.50 a day. I should say, roughly, that, as compared with the early part of 1914, our labor cost has advanced 55 per cent. The efficiency of the labor has not increased, nor has it fallen off, so that the tons per man per day remain just about the same as they were in the early year of 1914. We are not particularly short of labor, although it is rather difficult to get good machine men.

Powder has advanced, I should say, about 50 per cent. and in the last few months timber has gone up 15 per cent. Our power is derived from burning fuel oil and we fortunately have a long contract, so that the price of that article has not advanced. In fact, if anything, the cost per kilowatt-hour in our power plant has been reduced from 1.1c. to 0.9c. per kilowatt-hour, because of certain modifications which we made in our engines so as to be able to run the three of them continuously. Previously we have operated two and kept one as a spare.

Like Mr. Douglas, I can say that for 1916 the cost of copper will not be very much in excess of 1915. The cost of our copper in 1915 was about 8½c. a pound and I think that for 1916 it will be in the neighborhood of 9c. a pound, or only half a cent increase, notwithstanding this increased cost of labor, powder, timber and the various miners' supplies.

I think the principal factor which has held down our cost has been the increased tonnage, which has reduced overhead expenses per ton of ore, both actual overhead expenses and also in underground work, because the same number of foremen are able to supervise a larger number of men.

For purposes of comparison I have taken the two months of November, 1915, and November, 1916, for the reason that the grade of ore was very nearly the same. I can hardly give any credit to improved metallurgical conditions, because although flotation has helped us out some, we were floating in November, 1915, although probably not so efficiently as we are doing now, but I think the amount of oxidized copper in the ore is now slightly in excess of what it was in 1915. In the month of No-

vember, 1915, we treated but 130,000 tons, whereas in November, 1916, we treated 170,000 tons; that is, 40,000 tons more. The grade of ore in 1915 was 2.18 per cent.; this year it was 2.13 per cent. The net pounds of copper extracted per ton of ore, after allowing for smelter losses, were 30.9 lb. in 1915 and 30.3 lb. this year, so you see those metallurgical returns are pretty nearly the same. The production of 1915 was 4,011,242 lb., whereas this year it was 5,141,000, giving, of course, a larger divisor. Mining in 1915 was $1.04 per ton and this year it was $1.14, an increase of 10 cents.

I have divided, for these months, the cost of mining between labor and supplies. In November, 1915, the labor cost per ton was 55c. and the supply cost was 37c. This year the labor cost was 74c., very nearly a 50 per cent. increase, whereas the supply cost has gone down to 26c. That reduction in the supply cost is due to the fact that we are drawing much more ore from shrinkage stopes this year than last, so we are using less timber, less explosives, less of everything; hence a great many factors come in to complicate the results.

Milling has been reduced from 58 to 47c. The question of tonnage very largely enters here, notwithstanding the fact that we are doing finer grinding now than we were then.

The cost of general expense shows a decrease because of increased tonnage. In general expense we include everything which cannot be properly called mining, milling or smelting. That has fallen from 26c. to 18c. a ton.

Smelting is practically the same, 2.3c. per pound of final copper. This is so because we have a long-time contract and the smelter men, notwithstanding that his costs have gone up, gets only the same rate. I think, in our case, he possibly has a slight advantage, for the reason that he turns us back only 95 per cent. of the copper contained in our concentrate. I think his saving is probably in the neighborhood of 97 or 98 per cent., so he has gained slightly when copper sells at a higher price than it did last year.

The other items remain just about the same, so that, curiously enough, in November, 1915, our cost was 8.7c. a pound, whereas in November, 1916, it was only 8.2c. a pound. In other words, notwithstanding all these increased items, our cost is about ½c. a pound lower. This will not be the case for the whole year; for the entire year the average cost will be about ½c. a pound more.

W. R. Ingalls.—If I had known that I were going to be asked to contribute anything to this discussion I should have

made notes of some figures. Offhand, the only thing I think about is the matter of cost of zinc smelting, upon which Mr. Stone has already dwelt. Not long ago I had occasion to look over the cost sheets of a plant in the natural gas district, which is on the front, so to speak, where conditions have been most difficult, as Mr. Stone has pointed out. While with regard to this particular plant, which is a new concern, I had no means for comparison with previous years, out of curiosity I compared the figures with those of some other works of the same character a few years before the war. Of course the comparison is not a perfect parallel, for the works are not of the same capacity nor under the same management, but they are in the same district, where general conditions are the same.

The labor cost per ton of ore had doubled, being in round numbers $8.50 against $4.25 previously. Reduction material was $2.50 against $1.30. Retorts and condensers were $2 against 65c. Other clay material was 25c, against 11c. Miscellaneous supplies were 60c. against 20c. Repairs and renewals were $1.50 against 70c. General expense was $1 against 85c. The total was $16.35 against $8.25 These totals are exclusive of the cost of natural gas—the fuel—which lately has been almost anything that you please. Smelters have been paying 7, 8, 10c. a thousand cubic feet and even more. It will be observed that operating costs have increased from two to three times in all principal items except general expense, which was not much above that of normal times. This is because taxes and insurance have not increased, and as we all know the increase in salaries has been very small.

Increased operating cost is not the whole story in zinc smelting. In general the metallurgical extraction has fallen off, owing to the indifference and independence of the smelters and the necessity for employing a good many green hands. Experience in this respect has not been uniform. At some plants where the working force is of more permanent character there has been but little falling off. At other plants, however, recent results have been atrocious, and I know of one at least where they are nothing less than a metallurgical crime.

Mr. Stout.—Roughly speaking, our labor for the year 1916 received average wages 26 per cent. in excess of 1914. Present rates are 44 per cent. in advance of 1914. These figures are about the same as have been given by the other gentlemen present.

As to labor efficiency, man-hour per unit of product or charge, we found that when increased wages were demanded and obtained by a strike the efficiency fell off, in one case 28 per

cent., for a few months. On the other hand, by giving labor an increase sufficiently ahead of time for it to be more or less of a surprise, our efficiency has increased about 12 per cent. It may be noted, however, that an increased tonnage has had some effect in this direction. Our costs are reduced to base price of labor and metal losses. We allocate our metal losses to each step in the operations.

As refiners, we view the increase in labor and commodities with something akin to a panic, for the simple reason that, not being producers (only custom refiners with long-term contracts), our path is not made smooth by the receipt of 30c. per pound for our product.

The returning of 100 per cent. of copper by the refinery is a piece of stupidity on its part; the present price of copper has increased its costs, from metal losses alone, about $1 because of the necessity for purchasing 7 lb. of copper at 30c., to make good the losses, as against the usual 15c. per pound. As refiners, we should like to see copper go to zero. On the other hand, the smelter, with its usual 1.3 per cent. off, makes us wish copper were $1.

Consider a typical ore in the smelter: 14 per cent. copper, 61 per cent. slag fall. The price of copper at 30c. against 15c. has increased the value of this ore, to the producer, about $37 per ton. The increased toll from 1.3 per cent. at 30c., as against 15c., is $3.90. Of this $3.90 our labor received $1.50; supply men, 90c.; losses, 48c.; and we, an additional profit of $1.12 per ton. Of the $37 increased value there remains, as far as we are concerned, $33 per ton. From the conversation of the gentlemen present, I judge that the increased cost of mining and freight has been about $8 per ton on this ore, leaving $25 per ton net additional profit to producers, over and above normal times. It can be seen that their cries of distress are not, therefore, without their humorous side.

There is one phase of this question in which, as operators, we are interested, which has not been touched upon as yet this evening. I refer to the inevitable reaction. While we appreciate the difficulties in making both ends meet, encountered by one who buys or produces copper on a rising market, yet we imagine that his problems will be somewhat increased on a falling market. Even the most sanguine will not predict a continuation of present metal prices. A return to normal times will probably bring an adjustment in commodities which is the other fellow's job to regulate.

Since practically 70 per cent. of the refining capacity for copper produced in this country is situated here, if some scheme

can be devised by which wage reductions can be made without the usual friction, it would be highly desirable. As operators, we have been of the opinion that in the copper industry wages should be divided into two classes, base rate in one envelope, and a bonus, depending on price of copper, in another envelope. Please note I suggest labor should receive two envelopes. None of the refineries has such a scheme, and if it could be put into effect soon enough, so that the laborer would become educated to the variation in his bonus envelope as it relates to the price of copper, reductions might take place with less interruption of operations.

The Chairman.—We shall like to hear from some of the operators here tonight as to their views on this matter. Mr. Stout's suggestion that the bonus should not be a part of the pay or wages, but rather should be based upon the price obtained for the product, would probably simplify adjustment in the future very much.

Mr. Douglas.—Naturally, this is a question which has been very prominently before all of us, and there is, I daresay, a variety of ideas as to what will happen. On only one occasion have we had to meet the problem of lowering the wages scale on account of a drop in copper, and that occurred last July. We had been paying on a 27c. market, and in July the price dropped to about 23c.; in fact, there were no sales of any considerable tonnage of copper through the months of June and July, and such sales as were made were at a sacrifice. Therefore, in August, our men had to take a cut of something over 50c., and they took it; there was no kick at all. They were very familiar with this sliding scale of wages. In 1914, when copper dropped to 11c. or lower, we then cut the base rate by 10 per cent. Miners had been getting $3.75 and mucker $3.50, and they accepted a 10 per cent. reduction without any objection at all; it was a question of taking that or shutting down.

Another condition presents itself in our Western mining camps: a heavy drop in the price of copper means that production is restricted. We cease to work low-grade ores that are profitable only at a high price for copper, and a large number of men are necessarily thrown out of employment. Probably when the war ceases there will be a period of readjustment when the price of copper will be rather low; but I believe that when the price does drop it will drop fast, entailing a partial suspension of operations in many cases, absolute suspension in others, and very material curtailment in the whole industry. This will result in throwing a great number of men out of employment, and

I believe that a man who wishes to hold his job will accept the agreed wages when copper falls to the base figure.

Mr. Stout and the refiners around New York are confronted with perhaps a different condition. They are dealing with an extremely ignorant, unintelligent class of labor, which perhaps would not thoroughly understand the sliding scale, and I presume work along educational lines might help them as it has helped us, to a great extent, amongst our Mexicans.

Mr. Stewart.—I am afraid if I say much you will think I am like the old farmer who was on a jury and wanted to know, "if the man wasn't guilty, how in thunder did he get arrested?" These gentlemen are all talking about high costs. The zinc man's costs have gone up on account of labor, the brick man's costs have gone up on account of labor, the acid man and the retort man have all increased their prices on account of labor, and when it comes down to refining, the whole operation is labor; if these awful labor costs are confronting us it is rather strange that these companies do not go into bankruptcy with the terrible costs they have to meet, and how in thunder do they pay the dividends?

I think it is all a question of the distribution of the wealth that is being produced, and my own idea on the subject is that, after the war, we shall have worse labor conditions than we have now, rather than better. In normal times, according to Immigration Bureau statistics, 30 or 40 per cent. of all the immigrants go back; after they have accumulated enough to live on the sunny slopes of Italy or the Balkan hills, they return. We keep about 60 or 70 per cent. of them. Now, those who have been interned here by the war have accumulated vast wealth, for that class of people, and it is only human nature for them to want to go back and see what happened. As great numbers of men were taken out of industrial pursuits by this war, many were killed or crippled and many will be called upon to rehabilitate Europe, there is likely to be an exodus rather than an influx, and we shall have a worse labor situation after the war than we have now.

Mr. Rogers.—I have little to do with actual operations, but I have thought some about the subject we are discussing. In regard to the conditions after the war, I have no doubt that there will be a considerable exodus of labor from this country, and in view of that fact, there is likely to be some considerable reduction in the supply of labor. Whether the reduction in the extent of industrial operations will keep pace with that I do not see how you can very well tell.

Mr. Douglas was saying that he looked for a tremendous

slump in copper after the war. For my own part, I do not agree with that view. I do not see how that can occur when we have been given to understand that Germany and Austria have used up for munitions enormous amounts of copper that had been used for other purposes. It seems to me that this has to be replaced in some way. Again, industrial development in Europe has been at an absolute standstill for two years, which is true of a large part of the rest of the world, also. To my mind, that amount of industrial development must be made up. In other words, in some period of years following the war we shall experience more than normal increases in industrial development, so that there will be a market for all the copper we can produce for some years, probably not at 30c. but still at very good prices compared with those before the war.

The thought occurs to me, in connection with this educational campaign and the payment of extra wages as bonuses, that it might be well to post copper quotations somewhere in the works, so that these men may see on what basis they are being paid. In that way, when the reduction in copper came about, they could see why their wages were reduced.

Mr. Raymond.—The striking question which presents itself is what are we going to do about it. After the war, a great many men will go back to Europe and labor, instead of being as abundant as it is now, will be greatly reduced. One of the things that is beginning to be felt is the advantage of educating men and getting them worked up to a greater speed and greater efficiency. Some of the results of this, which are noticeable around the country, are shown in the good work being done in Arizona, where, in some of the mines, instead of getting out only 2 or 5 tons a day the men underground are getting out 10 or 15 to 25 tons, due to the development of mechanical appliances, betterment of drills, more efficient stoping, all tending, with the help which the mining companies are giving to the training of their men along this line, to reduce the cost and make the men more efficient. When we come against the fight, if you may term it so, with the men, we may be able to reduce wages somewhat on account of the price of copper, and the men will be willing to agree to a reduction, but we shall find they will demand as high a price, and perhaps higher, than in the ante-bellum days, so that better training for the workmen is a thing for serious consideration all along the line.

One of the most notable examples of this is an interesting case in the iron mines of Minnesota. The mining of ore from underground, whether it be soft ore or hard ore, costs about $1 a ton on the surface. One mine is doing a great deal better than

this by speeding up the efficiency of the men; they are worked in small gangs of 30 or 40 men, under charge of a district boss or a gang boss, the men being paid, not their usual wages of $3 a day, but at the rate of $2.50 a day, plus 8 to 10c. a car (or 10c. a ton) for the number of cars they get out. Every man speeds up to his utmost to get as many cars as he can and the higher wages per day. The extra wages for every gang of men throughout the mine is posted, so each man knows the next morning what he gained the day before. It is developing a wonderful state of efficiency among the men and a wonderful weeding out of inefficient men. This company is getting out its ore for about 60c. a ton. Those things pay, and training along that line is worth taking up throughout the whole country, particularly when our men are sure to be fewer in number after the war than they are now.

The Chairman.—You have heard several remarks as to the probability of fewer laborers after the war. I might state that I have recently been talking with a man who was pretty well conversant with the situation and he informed me that the North German-Lloyd and the Hamburg-American boats have been fully prepared to start on a moment's notice, that they had all their freight arranged for. The freight will consist primarily of cotton and food stuffs, cotton at the rate of 3c. a pound and food stuffs 2½c. a pound. What struck me most forcibly was that he said there was not a single further accommodation for passengers at present available on one of those boats. He even went so far as to say that the "Vaterland" would be the first boat to leave; hence, the statement in regard to the possible shortage of labor appears to be true. We all know what the capacity of these boats is as to passenger service. When we are told, on such authority, that all passenger space had been spoken for, it shows the tendency of those who are interned in this country to go back to the other side to see what has happened.

I think the statements of Mr. Stout and Mr. Rogers as to posting the price of copper or other product and that wages be based on this, would be a very good step. I know from my own experience that the bonus system has worked to great advantage.

Mr. Channing.—When the war broke out, instead of reducing wages at Miami—I think we were paying about $3.50—we simply put the men on half time. Each man worked three days a week and got his full rate. To those men who, of necessity, had to work the full week we made a 10 per cent. cut. The conditions very soon adjusted themselves. Men did not care to work

half time and they gradually drifted off, so that along in January, 1915, we were working our men full time.

I am very much inclined to think that when the reaction comes, as it surely will, we shall have to stop probably at a higher minimum than we had before. The men have increased their standard of living, and I do not think they will be satisfied to go back to the old one. If the cost of living should very materially decrease, which it is not likely to do, they might be satisfied. In the Globe-Miami district, merely that the labor unions might have something to say, it has often been suggested that this minimum should be placed at $4. We have not considered this officially, though we are probably inclined to suppose that maybe $4 may be the irreducible minimum.

As Prof. Raymond has suggested, there certainly is a very great opportunity for increase of efficiency. I never shall forget what Mr. Walter Fitch told me along in 1895. In 1893 he was running the Champion iron mine in northern Michigan and when the panic of '93 came they nearly had to shut down the Champion mine, but they didn't. They told the men, "Here is the price that we are going to get for a ton of ore that costs so much. Here is the balance that is left after paying for supplies, and we will give that to you. We will mine this ore and stock it, and in the spring send it down to Cleveland. If we get a new dollar for an old one, well and good. We won't consider the fact we are depleting the mine." Mr. Fitch told me that this one winter revolutionized things, and that the efficiency of the men doubled.

There are two ways in which you can increase efficiency. You may be able to educate the men up to doing better work, but of course, you must so modify your methods of mining, so improve your machines or your machinery, that you can get increased tons per man per day.

When we started the Miami mine, Mr. Lawton, who came from Michigan, was very anxious to introduce one-man machines. Our men said they had always been accustomed to two men to a machine and that is what they were going to do. Instead of bulling it through, we went around in the stopes and whenever we got a chance we told the men, "Here, this is wrong. You men have got the wrong idea of this thing. We don't want to have a man work alone with one of these great heavy machines. We want to give you light machines and instead of there being two men working in this drift with this large machine, we are going to give each a light machine, in a drift by himself. Now here is what you must realize. If we have got to work two men on a machine this ore isn't ore; it won't pay to treat it; but if we

can work one man on a machine, then it becomes ore, so that you're standing in your own light. It doesn't mean that one man is going to be thrown out; it simply means we are going to make places for two to work."

They gradually realized this and inside of a year you couldn't get the men to go back to two men on a machine, because they felt that now each man stood on his own bottom and the work he did he got credit for. Therefore, what we must do in the future is so to improve our mining and our metallurgical methods that we can afford to pay these higher wages, make the men better American citizens and permit them to live better, and we shall do just as well, make just as much profit, and shall have a much better and a much better satisfied community.

That is the point of view that we have. We have been trying to inculcate into some of these men the idea of saving at these high wages. When I was down there last, Mr. Gottsberger said he imagined probably only 10 per cent. of the men did any saving. Now, conditions have certainly improved in Arizona on account of the prohibition law. This law was in full force and effect for 15 months, then, by a strange decision of the Supreme Court, the importation of liquor for personal use was permitted. That went on for nine months. Last November the question was brought up of making the state really prohibition, and it was carried by a large majority, showing that the people themselves were in favor of prohibition; it wasn't something that was forced on them by an order of the Czar, as in Russia, or by the Government as in France or England. When men have that point of view, that they are willing to cut liquor out (which is one of the worst curses of the laboring man) you will find a pretty good community. They tell me, in Arizona, that when the prohibition law was first introduced, almost immediately the sales in the stores increased 25 per cent. The bankers did not notice any change until about six months, and then suddenly the bank deposits commenced to increase. They figured it out that it took the men six months to pay up their debts and then they were able to put something aside; hence the solution is not to try to cut wages to the minimum, but to try and keep them as high as we can, and to inculcate into the men the desire for efficiency and to show them if they are efficient and do good work that we *can* divide with them and that we *will* divide with them.

Mr. Spilsbury.—I have heard with a great deal of interest the complaints of the miners of copper and zinc on account of the increased cost of labor and of supplies. Nothing has been said as to the increased value of their products which they are enjoying during this time. I want to call your attention to the

poor, unfortunate gold miner. His product has not increased in value at all, while its purchasing power has decreased; therefore, while he is met with exactly the same conditions as the copper, the zinc, and the lead men, so far as the increase in the cost of labor and supplies is concerned, he is getting no more for his product than he did when everything was from 30 to 60 or 75 per cent. cheaper than it is now. You copper and zinc producers are all looking forward, though, to a terrible slump at the end of the war, while the gold miner is looking forward with great hopes to the time when he will once more continue to get his $20 an ounce real value for his product.

Prof. Peele.—I did not expect to be called upon to offer suggestions or information on such a subject as this. I have had chiefly to do for some years with a different kind of engineering work. But we, also, at Columbia are interested in the matter of increased cost, and it might be worth while to call the attention of those present to the fact that it is now costing much more than formerly to turn out graduates at the School of Mines. This is mainly due to the fact that about the time the war began a new schedule went into effect in the School of Mines, namely, the graduate course. Instead of the old four-year course, we have now a three-year course, preceded by the equivalent of three years of scientific college training, as preparation for entrance.

Since the change has gone into operation the size of the classes has been temporarily reduced, so that the cost of turning out a graduate during the next few years at the School of Mines will probably be two or even two and a half times what it has been under the old four-year plan. The smaller classes bring to the university a correspondingly reduced income from fees, while the cost of maintaining the School has certainly not decreased. But, running expenses have not increased in the same way that the cost of the operation of mines and metallurgical works have increased. Wages and salaries remain about the same up on the hill, notwithstanding the higher cost of living. However, we manage to get on.

The Chairman.—How about the value of the product?

Prof. Peele.—The value of the product, we hope, is being improved; not because it is costing more to produce it, but because of the better preparation at entrance. It used to cost for a School of Mines class graduating, say an average of twenty-five, about $2,600 or $2,700 per student. Of that, the student paid $1,000; that is, since the increase of the annual fee to $250, he would in four years pay $1,000. I suppose that, with the small classes in prospect for the next few years, it will probably cost

the University $5,000 or $5,500 per student. I don't know whether the gentlemen who are the prospective employers of these young men will think it necessary to increase the inducements to get School of Mines graduates into their service, but I hope so. We look forward to turning out even a better product than we have in the past, chiefly as the result of more thorough preparation on the part of the students.

My attention was attracted by Mr. Channing's remarks in regard to the difficulty experienced in introducing the one-man machine drill and it occurred to me that the case was very similar to the condition prevailing many years ago when it was proposed to replace hand drilling by machine drilling in the Lake Superior Copper Mines. It was almost impossible to get the miners to use the machines, and the Rand Drill Company, which was then one of the important makers of rock drills, had to send their own men underground to demonstrate to the miners that there was something in it for them as well as for the company. In this campaign of education, I have no doubt efforts will be made in other directions to prove to the miner and metallurgical worker that, by improved methods, he is not to be a loser but a winner.

Mr. Dubois.—The only thing I'd call attention to is Prof. Peele's remark about the personal equation of the miner. When we first introduced electric lights in the mines in the west the men actually struck because they didn't want to see the dangerous places.

Mr. Channing.—One point has been brought up on which I would like to speak a little. When you consider the cost of producing copper or spelter, it has got nothing whatever to do with the selling price of it. The reason a mining company makes money is, as one of the unfortunate smelters and refiners pointed out, because you own the raw material. Whether from an economic point of view this is a good thing for the country I am not prepared to say; perhaps the mines all over the country should be nationalized. The price that you get for your copper has nothing whatever to do with what it costs to get it out. The man whose copper costs 6c. a pound is getting as much as the man whose copper costs him 9c. a pound.

The poor smelter man and the poor refinery man must remember that, like Tennyson's brook, he can run on forever, while the mine has a limited life. The dividend is not exclusively a dividend but is partially a return of capital, and there are very large mines to-day whose stock was still—or three days ago was still—high (laughter), whose life is only 16 years, and it was de-

cided the most economical thing to do was to exhaust those mines in 16 years. Now, at the end of 16 years these mines will be wiped out, their stock will be valueless, and yet the smelter and refining man will go on, because other mines will be found to take their places. Hence, please remember if we are getting a high price for our metal now, we are only getting back some of our capital. We are getting it back in a rather concentrated form, but I think we realize it is a good thing to hang on to the money and not increase dividends too quickly.

In reference to old heavy machine drills, there is a Cornish story of an occurrence that took place on Lake Superior when the Rand drills were first introduced. There were two men in the Quincy mine who drilled a round of holes with the machine. They charged the holes, got ready to blast them, and one of the men said, "Well, John, what are ee going to do with they machine?" "I don't knaw. What are ee talking about?" "Ain't you going to take they machine out?" "God damme, No: I won't have a partner who can't come out to shaft when I be going to fire." (Laughter.)

The Chairman.—In connection with the improvements that have been made upon equipment, as a result of the war I might say a word with regard to my own personal contact with the steel mills and the large new plants that have been and are being erected in the Pittsburgh district. The Steel Corporation, as well as the independents, have laid out their plants to do away as much as possible with manual labor, such as the large new bar mills of the Steel Corporation, the Youngstown Sheet & Tube Co., and all the other similar plants. The work is laid out for as nearly a mechanical cycle as possible. The progress of the material is absolutely automatic.

All of the plants that are being laid out in the steel manufacturing districts to-day are planned with the idea of eliminating labor. The continuous mills are practically non-labor employing. I know the steel producers all over the country have realized that they have to consider very carefully this subject of labor, with the result that the plants have been laid out for mechanical efficiency, and I am sure we all feel that mechanical equipment is a very important factor.

The production of the blast furnaces has increased tremendously, and I know we shall all have to consider very carefully, in our future operations, the labor situation and the elimination of manual labor.

Mr. Channing.—I move a vote of thanks be tendered to our Chairman for the energetic manner in which he succeeded, first,

in getting so many of us here, and second, for the manner in which he has carried out the programme.

(Motion carried and the meeting adjourned at 9:50 P. M.)

D. M. LIDDELL,
Secretary of Section.

SAN FRANCISCO.

At a meeting of the San Francisco section held at the Engineers' Club, Nov. 16, 1916, the following members and guests were present: S. E. Bretherton, A. C. Lawson, E. L. Oliver, F. E. Probert, M. L. Requa, D. M. Riordan, W. H. Shockley, J. F. Newson, E. A. Hersam, C. W. McMeekin, C. C. Derby, E. T. Blake, Whitman Symmes, E. B. Kimball and Dean P. Mitchell.

The annual election of officers resulted in the selection of Frank H. Probert, Chairman, and Edwin Letts Oliver, Secretary.

Complete minutes of this meeting, at which the principal topic of discussion was the revision of the mining laws, will be printed in an early bulletin.

E. L. OLIVER,
Secretary of Section.

PERSONALS.

Howland Bancroft has returned to the United States after an extended absence in Bolivia and Chile.

Percy E. Barbour has returned to New York from Texas, where he has been since July 1, as first lieutenant in the 22nd Regiment of N. Y. Engineers, N. G. U. S.

Reginald W. Brock is second in command of the 196th Western Universities Battalion, which was recruited among the four Western Universities of Canada.

Will L. Clark visited New York recently.

Louis D. Huntoon has been in New Mexico on professional work.

J. E. Johnson, Jr., left New York for China, where he expects to remain about three months.

D. M. Liddell, consulting engineer for Merrill, Lynch & Co., left New York on a short professional trip.

Dr. H. M. Payne has returned to New York from a business trip to the Pacific Coast.

F. C. Schrader of the Geological Survey has been doing geological work in Nevada and New Mexico.

CHANGE OF ADDRESS.

Bancroft, Howland.....730 Symes Bldg., Denver, Colo.
Hellman, Fred..care of Guggenheim Bros., 120 Broadway, N. Y.

Mining and Metallurgical Society *of* America

CONSTITUTION BY-LAWS

RULES

OFFICERS MEMBERS

March 1, 1916

115 Broadway, New York

OFFICERS FOR 1916.

President, J. R. FINLAY, 52 William St., New York.

Vice-President, WALDEMAR LINDGREN, Mass. Institute of Technology, Boston, Mass.

Secretary, Treasurer, LOUIS D. HUNTOON, 115 Broadway, New York.

Executive Committee: Messrs. J. R. Finlay, L. D. Huntoon, A. S. Dwight, W. Lindgren, G. C. Stone.

COUNCIL.

At large, ex-officio.

J. R. Finlay, New York.....Retires January, 1917
Waldemar Lindgren, Boston.....Retires January, 1917
L. D. Huntoon, New York.....Retires January, 1917

Districts 1-2-3-4—New York, New Jersey and New England.

J. Parke Channing, New York.....Retires January, 1917
A. S. Dwight, New York.....Retires January, 1918
George C. Stone, New York.....Retires January, 1918
W. R. Ingalls, New York.....Retires January, 1919

District 5-6—Pennsylvania, Ohio, Maryland, District of Columbia, Virginia, West Virginia and North Carolina.

Hennen Jennings, Washington.....Retires January, 1917
R. A. F. Penrose, Philadelphia.....Retires January, 1919

District 7—Illinois, Iowa, Michigan, Minnesota, Missouri, Oklahoma, South Dakota and Wisconsin.

P. N. Moore, St. Louis.....Retires January, 1917

District 8—Colorado and Utah.

Philip Argall, Denver.....Retires January, 1918

District 9-10—Alaska, Oregon, Northern California.

M. L. Requa, San Francisco.....Retires January, 1918
C. W. Merrill, San Francisco.....Retires January, 1917

District 11—Southern California, Arizona, New Mexico and Texas.

S. W. Mudd, Los Angeles.....Retires January, 1919

District 12—Montana, Idaho, Washington, Nevada and British Columbia.

C. W. Goodale.....Retires January, 1919

OFFICERS OF SECTIONS.

SAN FRANCISCO.	NEW YORK.	PHILADELPHIA.
M. L. Requa, *Chairman.*	J. E. Johnson, Jr., *Chairman.*	F. L. Garrison, *Chairman.*
W. H. Shockley, *Secretary.*	A. H. Rogers, *Vice-Chairman.*	
	D. M. Liddell, *Secretary.*	

Editor, Edward K. Judd

CONSTITUTION.

Amended, Oct. 4, 1911.

1—Name.

The name of the association shall be Mining and Metallurgical Society of America.

2—Objects.

The Society shall have for its objects the conservation of mineral resources, the advancement of mining and metallurgical industries, the better protection of mine investors and mine workers, the increase of scientific knowledge, and the encouragement of high professional ideals and ethics.

3—Membership.

The Society shall comprise honorary members, and members who must be qualified by knowledge, experience, and honorable standing to advance the objects of the Society, and shall be proposed for, and elected to, membership as provided in the by-laws of the Society.

4—Members.

All interests in the property of the Society of persons resigning, or otherwise ceasing to be members, shall vest in the Society. No member or officer shall receive salary, compensation, or emolument unless authorized by the by-laws, or by concurring vote of two-thirds of the council. Members residing for a year or more beyond the limits of the United States, Canada and Mexico, shall not be entitled to vote nor to hold office during the period of such residence.

5—Officers.

The affairs of the Society, subject to the provisions of the constitution and by-laws, shall be managed by a council of fifteen members, who shall hold office for the prescribed term or terms. The executive officers of the Society shall be a president, a vice-president, and a secretary (who shall also be treasurer), which officers shall be members of the council ex-officio, and shall hold

office for one year, or until the close of the meeting at which their successors in office are elected, except that the secretary shall hold office until his successor accepts transfer of the duties of that office. Additional officers may be elected by the council from time to time if necessary for the purposes of the Society. All officers shall be eligible for re-election. Vacancy in the office of president shall be filled by the vice-president, who shall then become president, and the council shall forthwith elect a vice-president; and if necessary shall elect a member of council, of which the number must always be fifteen.

6—Annual Meeting.

The annual meeting of the Society shall be held on the second Tuesday in January of each year. One-third of the members, present in person or by proxy, shall constitute a quorum for the transaction of business.

7—Rules.

The Society may adopt by-laws, rules and regulations for the conduct of its business, provided that these are in harmony with this constitution, and may provide different methods for amending or repealing such by-laws, rules and regulations.

8—Amendments.

Amendments to the constitution may be presented at a regular or business meeting of the Society; and if endorsed by the council, or in writing signed by at least twenty members, a copy of such proposed amendment shall be sent to all entitled to vote, accompanied by comment by the council if it so elects, at least thirty days in advance of a second meeting called for its consideration; at which meeting the amendment may be amended as to wording but not as to intent, and then shall be submitted to a final vote by sealed letter ballot sent to all members; the polls shall be open for sixty days, and for the adoption of the amendment a majority of those entitled to vote shall be required to have been recorded in the affirmative; provided, however, that a negative vote comprising a majority of the votes cast shall defeat the amendment. If the necessary vote for adoption or for rejection is not secured on the first ballot, the council shall order the sending of a second ballot by registered mail to members who have not recorded their vote; and in such case, so many of these second ballots as have been received by members, if not voted within a further period of sixty days shall be counted as votes cast in the affirmative. The ballots shall be voted, canvassed and announced as provided in the by-laws.

BY-LAWS.

Amended Sept. 5 and Oct. 4, 1911, and Mar. 13, 1913.

1—Admission to Membership.

A candidate for membership or two members proposing him shall submit, in such form and in such detail as may be prescribed in the rules and regulations of the council, a record of his training and practice. The candidate must have had eight years' practical or professional experience, including not less than five years in positions of responsibility in mining or allied lines of work. Graduates of approved engineering schools shall be credited with one-half the time prescribed for graduation. The candidate must be endorsed by three or more members who shall further certify in writing as to his qualifications for membership. These statements must be based on long or intimate personal knowledge, and shall be submitted in such manner as the council may direct. The names of the candidates, after approval by a duly appointed committee of the council, shall be submitted to all members of the Society entitled to vote, with the request that said members of the Society present in writing promptly, any objections that they may have against a candidate on the list. Thirty days after the mailing of the list, the committee of the council shall consider the communications received from members of the Society, and with the approval of the committee, the secretary of the Society shall then submit the name of the candidate to the whole council for secret letter ballot. The affirmative votes of a majority of the council shall be required to elect, but three adverse votes, received within thirty days, shall be sufficient to defer the election of any candidate, and the council may include the name of any such candidate on the ballot for any subsequent election of members. The application of any candidate shall be considered as pending unless it be withdrawn, or unless by a majority vote of the council the candidate be rejected. A candidate may renew his application a year or more after his rejection.

2—Admission to Honorary Membership.

Honorary members, not to exceed ten in number, must be proposed in writing, setting forth at length the qualifications of the candidate, and signed by at least twenty members of the Society. The candidate must be elected by vote of the council which shall be by sealed letter ballot. One dissenting vote shall defeat such election. Honorary members are not entitled to vote nor to hold office and shall not be required to pay initiation fees nor annual dues.

3—Subscription to Constitution and By-Laws.

All elected candidates shall be duly notified, and shall subscribe to the constitution and by-laws in such form as the council

may direct. This latter provision shall not apply to honorary members. The membership of any person shall date from the day of his election.

4—Annual Dues and Life Membership.

The annual dues shall be ten dollars, payable in advance on the first day of January of each year. Persons elected after nine months of any year have expired shall pay only one-half of the dues for that year. The council may, for sufficient cause, remit the whole or part of dues in arrears. The executive committee of the council may drop from membership any member more than one year in arrears for annual dues, but may reinstate such member at its discretion. The council shall permit any member, not in arrears, to become a life member on payment of a sum deemed adequate for the purpose by the council, and based on his expectation of life according to reliable tables of mortality. Such life membership and initiation fees shall be invested, and the income only shall be applied to the current expenses of the Society.

5—Resignations.

Any member, not in arrears in payment of dues, may terminate his connection with the Society by sending his resignation in writing to the secretary.

6—Discipline.

The membership of any person in the Society may be suspended or terminated for reasons of weight by a four-fifths vote of the council. Notice of such intended action shall be sent to such member by registered mail, and action shall not be taken for at least thirty days after the receipt of this notice by such member. A member suspended or expelled may demand a sealed letter ballot sustaining the action of the council. This ballot shall be sent to all members entitled to vote and may be accompanied by a statement signed by the council or a committee thereof, and by a statement on behalf of the accused of not more than one thousand words, or not exceeding in length that prepared by or for the council. A majority of the votes received within thirty days shall be required to reverse the action of the council.

7—Election Districts.

The council shall from time to time divide the territory occupied by the membership into twelve geographical districts to be designated by numbers. Each of the districts shall be, as nearly as practicable, contiguous territory; and each shall contain as nearly as practicable an equal number of members. The council shall announce such division to the Society three months before the annual meeting. The council shall consist of the president, the vice-president and the secre-

tary; and of twelve members, elected one from each district, and the terms of office of such twelve councillors shall be arranged so that four of them shall expire each year.

8—Officers.

The officers of the Society, as provided in the constitution, shall be elected as hereinafter provided, except that whenever a vacancy occurs it shall be filled by a majority vote of the council. Their respective terms of office shall begin at the close of the meeting at which they are elected. The duties of the several officers shall be such as usually attach to the office, or such as may be determined by the council. The council may delegate its powers to persons or committees, and may make such rules and regulations as may be necessary for the proper conduct of the business of the Society, provided that these are in harmony with the constitution and by-laws.

9—Councillors.

The term of office of a councillor shall begin immediately upon election. Vacancies occurring at any time in the council may be filled until the next annual election by a majority vote of the remaining members. At the next annual election new councillors shall be elected to fill such vacancies for the unexpired terms of office only.

10—Nominations.

Three months before the annual meeting, the secretary shall send a nomination ballot to each member of the Society in the districts for which new councillors must be elected, with the request that he shall nominate three members, in such manner as the council may direct, as candidates for councillor to represent his district; and shall send a nomination ballot to each member of the Society entitled to vote, with the request that he shall nominate one member for president, one for vice-president and one for secretary. Nominations shall be received for 20 days, when the polls shall be closed and the ballots counted by the Secretary. Sixty days before the annual meeting the Secretary shall issue a ballot, containing in and for each of these districts not less than three names, and for the offices of president, vice-president and secretary, each, not less than three names, which shall be in each case those receiving the largest number of nominating votes. Provided, however, that the ballot may comprise less than three names for any office if less than three persons have been nominated for that office; and, moreover, that persons receiving less than seven votes for an executive office and less than three votes for councillor may be disregarded, and provided further, that no person may stand for more than one office, and when votes are cast for the same person for more than one office he shall be placed on the ballot only for that office for which he has the largest number of votes. The ballot prepared

as thus directed shall be mailed to each member of the Society entitled to vote, who may vote for one councillor in each district, having the right to substitute names not on the list, and to cast not over three votes for a single candidate, provided that the total number of votes cast by such member shall not exceed the total number of vacancies to be filled; and who may cast one vote for president, vice-president and secretary, respectively, having the right to substitute names not on the list. The ballot shall be signed, sealed and voted as prescribed in by-law 15.

11—Canvassing Ballots for Councillors.

At noon of the first day of the annual meeting the polls shall be closed and the ballots counted by two tellers appointed by the president. Councillors shall not be eligible for such appointment. The candidate for councillor in each district, and the candidate for the respective elective offices, receiving the largest number of votes, shall be elected. In case of a tie the president shall cast the deciding vote.

12—Meetings of Council.

Meetings of the council for the transaction of business may be called at any time by the president, and shall be called at the request in writing of three councillors. Unless for reasons of weight, at least ten days' notice of meetings shall be given. Five councillors, present in person or by proxy, shall constitute a quorum. A letter ballot of the council shall be taken on any question of importance, if so ordered by the presiding officer at any meeting, or at the request in writing of three councillors. Whenever a letter ballot of the council be taken, a majority vote of the council shall be required to pass the motion put to ballot, except that letter ballots upon candidates for admission to membership shall be decided as provided in by-law 1.

13—Meetings of the Society.

The council shall provide for regular stated meetings of the Society, for the transaction of business, or for the reading or discussion of papers, to be held at such times and places as may best serve the interests of the Society. Special meetings of the Society, or of any section thereof, for a definite purpose, may be called by the president, or shall be called on a request in writing signed by twenty members. It shall not be in order at a special meeting to transact other business than that stated in the call for the meeting. Except for reasons of weight, at least thirty days' notice shall be given of all meetings. Except at annual meetings, ten members present in person or by proxy shall constitute a quorum. Resolutions endorsing or condemning matters of public or professional interest shall take such course as may be prescribed by the council in duly formulated rules, but such rules

must provide that not less than thirty days be allowed for any ballot of the membership of the Society.

14—Local or Professional Sections.

Local sections, or professional groups of members of the Society, may be organized for social, scientific and professional purposes, in harmony with the constitution and by-laws, and such sections shall have only such powers, and shall act under such rules and regulations as the council may from time to time approve.

15—Sealed Letter Ballots.

When sealed letter ballots are required by the constitution or by-laws, the envelope to contain the ballot shall be so designed that it can be signed on the outside by the voter for identification, and can afterward be opened by the tellers so as to preserve the secrecy of the ballot. The endorsement may take the form of a proxy, to be voted by the tellers appointed by the president, or by such other person, not a councillor, as the member may designate. The ballots signed and sealed shall be mailed or delivered to the secretary, who shall be responsible for their safe-keeping, and who shall endorse thereon the date and time of receipt and make record of such receipt on a list of members kept for the purpose. Any member shall have the privilege, at any time before the closing of the polls, of substituting another ballot, in which case the original shall be returned to him unopened. After the closing of the polls, the ballots, arranged in alphabetical order, with the check list of members above mentioned, shall be delivered by the secretary to tellers appointed by the president. The tellers shall verify the check list, and open and mix thoroughly the votes in such manner as to preserve the secrecy of the ballot. The ballots after being counted by the tellers, shall be destroyed, and the report of the tellers shall be the official record of the vote. In case a supplementary ballot shall be ordered for members failing to vote on the first ballot, the members whose votes have been counted shall not be permitted to vote a second time nor to change their original vote. The result of the ballot shall be communicated to the members of the Society at such time and in such manner as the council shall determine.

16—Vote of Confidence.

The council, by a two-fifths vote of its members, or upon request in writing of twenty per cent. of the members of the society, shall submit any question to the membership for a vote of confidence. Such vote must be inaugurated within fifteen days after a motion for a vote of confidence has been passed; and the majority of votes received within thirty days after issuance of the ballot shall decide. In case such question is decided against the council, the members thereof shall forthwith resign office, their resignations to take effect on the election of their successors, and

a new election of the whole council shall be immediately ordered to be conducted as provided in the by-laws. The new councillors shall by lot divide themselves into three classes to serve until the next annual meeting and for one and two years thereafter respectively.

17—Amendments to By-Laws.

Amendments to the by-laws shall take the course provided for amendments to the constitution, save that when the letter ballot is taken a majority of the votes received within thirty days shall pass or defeat such amendments.

RULES AND REGULATIONS.

A.—Rules Governing Resolutions.

1. Resolutions upon matters of interest to the Society, or upon matters that it is desired to submit to the entire membership of the Society, other than amendments to the constitution and by-laws, may be introduced at any meeting of any local section. Upon adoption by such section, the secretary of the section shall communicate the resolution as adopted to the secretary of the Society, who shall promptly lay it before the council. The council, after consideration of such resolution, shall (1) submit it to the membership of the Society for vote by letter ballot as provided in the by-laws; or (2) make such amendment as in the opinion of the council is desirable, without, however, altering the intention of the resolution, and then shall submit it to vote by the Society; or (3) reject the resolution and return it to the section that communicated it, with the reason for rejection.

2. A local section when notified by the council of the rejection of a resolution may reiterate that resolution; and upon receipt by the council of report of such action, the council shall then promptly submit the resolution to the membership of the Society, without amendment, but the council may accompany the resolution with a memorandum respecting its own action in the case.

3. If the council receives resolutions bearing upon the same subject from two or more local sections, the council shall select for submission to the Society that which in its opinion is the most adequate for the purpose intended; or the council may frame a composite resolution, to which new matter may be added, and shall submit such resolution to the membership of the Society as a resolution proposed by the council in lieu of those adopted by two or more local sections.

4. Any seven members of the Society, not affiliated with any local section, may unite in presenting a resolution to the council, and the council shall act upon such a presentation in the same way as provided under rule 1.

5. The council itself may initiate a resolution and submit it directly to the membership of the Society for letter ballot.

B.—Rules Governing Local Sections.

1. Local sections of the Society may be formed for promoting social intercourse among members, and for reading papers, and discussing subjects pertinent to the objects of the Society, and not inconsistent with the constitution and by-laws of the Society.

2. Such sections may be organized wherever there be 15 members in any city or town, or in places adjacent thereto, upon the request of 10 or more of such members addressed to a councillor, who may thereupon call a meeting of members residing within the limits of the proposed section, and if not less than seven members attend such meeting, they may thereupon organize such section, elect officers, comprising at least a chairman and a secretary, and adopt rules and regulations for their local government, not inconsistent with the constitution and by-laws of the Society; provided that said rules and regulations, or any subsequent amendment thereof, shall forthwith be submitted to the council of the Society, and shall not become effective until approved by the council; and provided, that all members of the Society residing or engaged professionally in the district included by any section shall be invited to become members of said section; and provided that any such member, upon application and upon complying with the rules and regulations of said section, shall be admitted to membership therein; and provided that all expenses incurred by said section, except as noted below, shall be defrayed by said section.

3. The secretary of each local section shall notify the secretary of the Society as to the names of members enrolled in his section and shall promptly inform the secretary of the Society respecting any resignations from or additions to membership. In the event of any dispute as to membership, or the right to enroll members, the matter shall be referred to the council of the Society, whose decision shall be final.

4. The Society will pay, on request, two-thirds of the actual cost of stenographic reports of the meetings of any section, provided that the amount so paid does not exceed one-half the dues paid into the general treasury by the members of such section, nor exceed $100 in any one year.

5. Dues or assessments for the defrayment of the expenses of local sections shall be levied as each section shall determine, but shall not exceed $5 per member in any one year. The failure of any member to pay such section-charges shall be reported to the council of the Society and delinquency for more than one year after notice has been served shall be a reason sufficient for the suspension or termination of the membership in the Society of such delinquent member. Any member not in arrears in payment of section-charges may terminate his connection with any section by written notification to the secretary thereof. If by resignation, or otherwise, the mem-

bership of any local section shall fall below 15, the existence of such section may be terminated by the council.

6. The proceedings of local sections, including papers and discussions, shall be reported to the secretary as hereinafter provided. No section shall, without the approval of the council of the Society, permit any account of its proceedings or of its papers or discussion to be printed in any newspaper or technical publication, nor shall any such section print or publish any proceedings, without the assent and approval of said council, nor issue any printed matter, except the necessary notices, etc., relating to the management of the section. No section shall at any time perform any act or deed which is properly a function of the Society.

7. The geographical limits of each local section shall be subject to such amendment or limitation as the council of the Society may from time to time determine.

8. All members of the Society shall have the right to attend all meetings of all sections.

9. Honorary members of the Society shall be exempt from dues to any local section.

10. The order of business at meetings of local sections shall be:

a. Reading of minutes of previous meeting.
b. Transaction of business.
c. Discussion of professional and technical questions.

11. The proceedings at each meeting of each section shall be promptly reported by the section-secretary to the secretary of the Society.

C.—Rules for Award of Annual Medal.

1. A gold medal shall be awarded by this Society each year for conspicuous professional or public service for the advancement of the science of Mining, of Metallurgy, or of Economic Geology; for the betterment of the conditions under which these industries are carried on, for the protection of mine investors, and especially for the better protection of the health and safety of workmen in mines and metallurgical establishments.

2. This medal shall be awarded at the annual meeting of the Society in January.

3. Six months before the annual meeting of the Society, the council shall determine the specific object for which the medal shall be awarded, and four months before the annual meeting of the Society the members of the Society shall be asked to nominate candidates on a form provided for the purpose, such nominations to be accompanied by a full statement of the claims of the candidates for consideration. These nominations shall not be confined to members of the Society and may include other nationalities than our own.

4. Three months before the annual meeting of the Society, all nominations shall be considered by a committee of three to be appointed by the President. At least two months before the award this committee shall submit a list of two names to the council with a full statement of the claims of each candidate. The committee may consider and recommend names not nominated by members of the Society. The names so recommended shall be submitted to the council for election by letter-ballot.

5. For the election of a candidate a majority vote of the council shall be necessary. If this majority be not obtained on the first election other ballots may be taken either by letter or at a meeting of the council called for the purpose. At such meeting members of the council may be represented in proxy.

D.—Rules for Publishing the Bulletin, and for Reporting Minutes of Local Sections.

1. The Society shall publish monthly (and at intermediate times when necessary) a bulletin, which shall be the official record of the proceedings of the Society, and of its local sections. The bulletin shall be published under the direction of the Secretary of the Society and shall contain announcements by the officers, the minutes of meetings of local sections, communications from members, and such other matter as in the opinion of the council or of the officers of the Society may be proper and useful in promoting the purposes of the Society.

2. The regular numbers of the bulletin shall be published on the last day of each month, or as near thereto as is possible, but the council may for reasons of weight delay the publication of any bulletin.

3. Secretaries of local sections shall be responsible for the primary editing of the reports of meetings of their sections and shall deliver to the Secretary of the Society a properly prepared manuscript report, in duplicate, each copy signed by the section-secretary.

4. The Secretary shall file one of these copies among the official records of the Society and shall use the other copy in connection with the preparation of the bulletin.

5. Matter intended for publication in any bulletin must be delivered to the Secretary of the Society before the twentieth day of the month of publication, unless the publication of the regular bulletin has been delayed by direction of the council.

6. The Secretary may, for reasons of weight, withhold matters submitted for publication in the bulletin, other than official announcements by the officers of the Society or by the council; but in the event of such withholding he shall forthwith notify the President and present the case to the council, at its first following meeting, which shall act upon it.

LOCAL RULES.

NEW YORK SECTION.

1. The officers of the New York Section of the Mining and Metallurgical Society of America shall be a chairman, a vice-chairman and a secretary, who shall be elected at the first meeting after the summer of each year, and shall hold office for one year from that time. These officers shall constitute the executive committee of the section.

2. The expenses incurred by the section shall be divided equally among all its members, and shall be payable at such times as the executive committee shall name.

3. In the absence of the chairman and vice-chairman, the meeting shall elect a chairman *pro tem.* to serve at that meeting. In the absence of the secretary, the chairman shall appoint an acting secretary to serve for that meeting.

4. The secretary shall keep a record of the proceedings of the meetings, and immediately after each meeting shall forward to the general secretary of the Society a report of the proceedings.

5. The presence of seven members of the section at a meeting shall constitute a quorum.

6. Members shall have the privilege of bringing guests to ordinary meetings of the section, but not to meetings previously announced as executive.

PHILADELPHIA SECTION

1. The officers of the Philadelphia Section of the Mining and Metallurgical Society of America shall be a chairman and a secretary, who shall be elected at the first meeting after the summer of each year, and shall hold office for one year after that time.

2. The expenses incurred by the section shall be equally divided among all members of the section, and shall be payable at such times as the chairman may name.

3. In the absence of the chairman, a meeting shall elect a chairman *pro tem.* to serve at that meeting. In the absence of the secretary, the chairman shall appoint an acting secretary to serve for that meeting.

4. The secretary shall keep a record of the proceedings of the meetings, and immediately after each meeting shall forward to the general secretary of the Society a report of the proceedings.

5. The members of the section shall have the privilege of bringing guests to the meetings of the section.

ANNOUNCEMENT

Adopted by the Council and published in the first bulletin of the Society.

It has been decided by the council of the Mining and Metallurgical Society of America to issue to the members a monthly bulletin similar to this, which will record the proceedings of the Society. In presenting this, the first bulletin of the Society, it is deemed desirable to outline the purposes of the Society suggested in the preliminary correspondence among those who became the charter members and developed in the discussion at the organization meeting. It is contemplated that the Society will enter immediately into five principal fields of activity, as follows:

(1) The establishment of local sections, to promote acquaintance among the members, good fellowship, and the interchange of views respecting technical and professional matters. It is intended that these local sections shall hold frequent meetings, probably once a month, all of the sections to hold their meetings on the same day. It has been suggested that these meetings take the form of a dinner, or smoker, to be followed by conversation and discussion. Such action as may be taken upon matters of interest will be reported to the general secretary and published in the monthly bulletin of the Society. If in the opinion of the council of the Society any matter be of such general importance as to deserve discussion by all of the sections, they will be requested by the general secretary to take it up. In addition to the meetings of the local sections, there will be in each year at least one meeting of the whole Society.

(2) The determination of standards in engineering practice, such as is being done by the Institution of Mining and Metallurgy. The Institution has from time to time appointed committees to consider technical questions as to which there is confusion, with the view to recommending a standard of practice that all members of the Institution are urged to adopt. Among the questions that have been taken up by the Institution of Mining and Metallurgy are the definition of what constitutes the development of ore, the establishment of a standard of screens for use in screen analysis, and an agreement as to weights and measures commonly employed in mining and metallurgical work. Efforts to secure standardization and uniformity of methods have also been made by other technical societies. There is a great field for useful work in this direction, and it is considered to be one that the Mining and Metallurgical Society of America may profitably enter.

(3) The discussion of questions relating to professional practice and ethics, with a view to the gradual formulation of rules for guidance, determined by the consensus of opinion in

the Society. Mining and metallurgical engineers are accustomed to speak of themselves as professional men, but in their actions they often show that they do not seriously regard themselves as such. This may be due to a large extent to vagueness in ideas respecting professional propriety. Consequently, it is considered that the Mining and Metallurgical Society of America will serve a useful purpose in discussing details of professional practice, such as the relation between the engineer and his clients, the matter of contingent fees, the communication of gratuitous advice. These are merely a few matters which suggest themselves. It is considered that a discussion of such questions relating to professional practice and ethics will lead eventually to the establishment of a code of ethics, developing the brief but comprehensive treatise on this subject by Sir Francis Bacon in the preface to his "Maxims of the Law" as follows: "I hold every man a debtor to his profession; from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereunto."

(4) The discussion of questions of public policy in which the profession of mining engineering is directly concerned. There are many questions arising in connection with the federal and state governments, which have a direct bearing upon the interests of the mining and metallurgical engineer, just as in the case of other professional men. For example, there has lately been a movement in the State of New York to compel every analytical chemist to secure a license from the State before being permitted legally to practice his profession; similarly it has been suggested that the states should pass laws requiring mining engineers to be licensed. It is no part of the present purpose to discuss or put any weight upon these particular propositions; they are mentioned merely as examples of matters of public policy which come up from time to time, affecting the profession of mining and metallurgical engineering, in connection with which the profession has heretofore had no means of expressing the consensus of its opinion. The Mining and Metallurgical Society of America will be a medium for the expression of such opinions.

(5) Finally, it is intended that the Mining and Metallurgical Society of America shall be a strictly professional society, i. e., membership in it will be limited to the ranks of the mining and metallurgical engineers, and mining geologists. Serious qualifications are prescribed as a prerequisite to membership, and it is the purpose of the founders of the Society to maintain a high standard of personal character and professional ability among the membership. In pursuance of this policy, applications for membership will be subjected to rigid investigation in substantially the same way as is done by the American Society of Civil Engineers. It is hoped that this will cause the Mining and Metallurgical Society of America

soon to become recognized as representative of the best in the mining and metallurgical profession of North America. Membership in the Society obviously will not be an unqualified endorsement, but it will be a recognition of good standing among and by members of the profession, which in many ways will be useful. It is proposed in the list of members of the Society to print brief records of their professional careers.

CERTIFICATE OF INCORPORATION

We, the undersigned, being desirous of associating ourselves together as a non-stock membership corporation, for scientific, educational and social purposes, as hereinafter more particularly set forth and described, pursuant to and in conformity with the Acts of Legislature of the State of New York relating to membership in non-stock corporations, do hereby certify and declare that we are all of full age, all of us are citizens of the United States, two of us are residents of the City, County and State of New York, and one of us is a resident of the City and State of New York and all of us have had at least eight years' practical or professional experience, including not less than five years of responsibility in mining or allied lines of work.

We do further certify and declare that the particular objects for which this corporation is to be formed, and the qualifications required for active membership therein are as follows; viz.,

First. To bring together, as Honorary Members and Members, those who are qualified by knowledge, experience and honorable standing acquired by at least eight years of practical or professional experience, including not less than five years in positions of responsibility in mining or allied kinds of work, for the specific purpose of thereby advancing the particular objects of the Society, to wit: the conservation of mineral resources, the advancement of mining and metallurgical industries, the better protection of mine investors and mine workers, the increase of scientific knowledge, the encouragement of high professional ideals and ethics, and the cherishing of the spirit of brotherhood among its members.

Second. That the corporate name by which said corporation, hereby to be formed, shall be known and distinguished, is and shall be:—Mining and Metallurgical Society of America.

Third. That the territory in which the operations of said corporation are to be principally conducted is the United States of America, Canada and Mexico.

Fourth. That the principal office of said corporation shall be located in the Borough of Manhattan, City, County and State of New York.

Fifth. That the number of directors of the said corporation shall be fifteen.

Sixth. That the names and places of residence of the persons to be the directors of said corporation until the first annual meeting, are

Walter R. Ingalls, 505 Pearl Street, New York City.
Henry S. Munroe, Columbia University, New York City.
Robert H. Richards, Massachusetts Institute of Technology, Boston, Mass.
William A. Lathrop, 108 South Fourth Street, Philadelphia, Pa.
Henry M. Chance, 819 Drexel Building, Philadelphia, Pa.
William N. Page, 1863 Kalorama Road, Washington, D. C.
Horace V. Winchell, 505 Palace Building, Minneapolis, Minn.
Ernest R. Buckley, Rolla, Missouri.
J. Parke Channing, 42 Broadway, New York City.
Joseph Hyde Pratt, Chapel Hill, North Carolina.
Charles W. Goodale, care Boston & Montana Cons. C. & S. Mng. Co., Butte, Montana.
Philip Argall, 730 Majestic Building, Denver, Colorado.
Frederick W. Bradley, Crocker Building, San Francisco, Cal.
John C. Branner, Stanford University, Cal.
Samuel B. Christy, University of California, Berkeley, Cal.

Seventh. That the annual meeting of said corporation shall be held on the second Tuesday of January in each and every year.

Eighth. That the duration of the corporation shall be thirty years.

In Testimony Whereof, we have made, signed and sealed this certificate in duplicate, and have hereunto set our hands and affixed our respective seals this day of , one thousand nine hundred and ten.

(Signed) HENRY S. MUNROE, (Seal)
(Signed) WALTER R. INGALLS, (Seal)
(Signed) ROBERT H. RICHARDS, (Seal)
(Signed) HENRY M. CHANCE, (Seal)
(Signed) J. PARKE CHANNING, (Seal)

The above certificate was signed and acknowledged on dates between Nov. 18 and Nov. 28, 1910, and was filed with the Secretary of State of New York on Dec. 2, 1910, and in the County of New York on Dec. 5, 1910.

FORMAL ACTIONS

Since its organization, in 1908, the Mining and Metallurgical Society of America has expressed itself formally upon public questions as follows:

Protection of Mine Investors.—Adopted by letter-ballot Aug. 7, 1909:

WHEREAS: The overvaluation of mining properties by investors and the public, due to ignorance of mining conditions and a lack of appre-

ciation of the real nature of the investment, tends to increase unduly the profits of mine promoters and speculators, and to increase unnecessarily the financial risks taken by mine investors, to the ultimate disadvantage of the mining industry,

RESOLVED: That it is the opinion of the Mining and Metallurgical Society of America that, for the protection of shareholders and investors, every mining company should publish an annual report within ninety days of the close of its fiscal year, and such report should incorporate the following information:

1. A brief review of the past history of the property, the work accomplished and the results obtained, with tabulated statement of expenditures and receipts from the beginning, marketable products made each year, and the sums received from the sale of same, the annual net earnings and the disposition made of such earnings.

2. A similar review, but in more detail, of the work of the year, with statements of the assets and liabilities (these statements to show all details as to capitalization of the company; the number and classes of shares outstanding at date of the report; the respective rights of these shares; the number of shares remaining in the treasury; any options or contracts on such shares; any bonded indebtedness); receipts and disbursements, cost sheet and other information as to work accomplished and results obtained.

3. A statement of ore reserves at the date of the report, compared with the reserves of the previous year, with an estimate, by competent authority, of the probable life of the mine.

Appointment of State Mine Inspectors.—By vote of the membership, July 18, 1911, it was "Resolved that, in the opinion of the Mining and Metallurgical Society of America, State inspectors of mines should be appointed and should not be elected."

Supreme Court of the United States.—By vote of the membership, Jan. 8, 1912, the Society adopted a memorial to the President of the United States calling attention to the importance of carefully considering the mining industry in its relations with the Federal Courts and requesting that jurists of distinction and noted ability and experience in this and associated industries be considered in connection with the filling of a vacancy in the Supreme Court.

Alaska Coal Lands.—By vote of the membership, Jan. 8, 1912, the following resolutions respecting the Alaska coal land question were adopted:

1. It is essential for the proper development of Alaska that its coal fields be opened for commercial use without further delay.

2. There are now known to exist but two relatively small fields containing high-grade naval fuel, and inasmuch as the government now possesses no original source of such supply on the Pacific coast it is desirable in the interests of national defense that a selected area of these fields be held and operated under the direct control of the government.

3. All rights which have accrued legally under statutes heretofore existing should be recognized.

4. If it be decided by the Congress that it is to the best interests of public welfare that coal lands in Alaska be leased, we recommend that the following conditions should be embodied in the leases:

a. These leases should be made for all the coal in the ground.

b. The royalty should be low and based on percentage of selling price of the coal at the mines.

c. The minimum annual production upon which royalty is to be paid should be nominal for the first two or three years after the execution of the lease in order to permit and encourage the installation of efficient and durable equipment. After that period the minimum production upon which royalty should be paid should increase more rapidly than the area increases. For example: the minimum production upon which royalty should be paid on a tract of 5,000 acres should be several times more per acre than for 1,000 acres. Such a plan would prevent the tying up of large areas of undeveloped coal territory.

d. A due-diligence and forfeiture clause to effect continuous work should be included in the lease.

e. Leasehold in coal lands should include all necessary timber, mining and surface rights.

f. Leases should not be given for less than 40 acres and in shape should be rectangular, their boundaries being east and west and north and south, and after the system of public surveys has been extended to Alaska and the land applied for is in a surveyed township, the unit areas of a lease should be those established by the government survey as subdivisions of the sections.

g. The length of the tract of land embraced within a single lease should not be more than three times as great as its width.

5. It should be clearly recognized as a basic principle that the value to the nation of coal lands in Alaska lies more in their use for industrial, commercial and naval purposes than in the royalties to be derived therefrom, and it is desirable that the revenue obtained from coal royalties inure to the benefit of the territory.

U. S. Bureau of Mines.—By vote of the membership, Jan. 8, 1912, a draft for a bill establishing the U. S. Bureau of Mines was approved. (See p. 3, Bulletin No. 44).

A Public Building for Geology and Mining.—By vote of the membership, Feb. 16, 1913, the Congress was urged to provide in Washington for the joint use of the U. S. Geological Survey and the U. S. Bureau of Mines a fire proof building of an architectural design reflecting the importance and dignity of the mining industry.

Patent Legislation.—By vote of the membership, Feb. 16, 1913, the Society urged the Congress of the United States to hold in abeyance all proposed legislation affecting the patent system in whatsover way until such time as a proposed commission shall have had time to hold hearings and make a study of the subject and report.

Oil Land Legislation.—The following set of resolutions were introduced by the San Francisco and New York sections. They were amended and adopted by the council on Mar. 13, 1913. They were adopted by letter-ballot on May 1, 1913:

1. There being no laws at present under which oil land can be acquired satisfactorily, a special Federal law should be enacted, governing the acquirement of oil, gas, and asphalt lands, and all lands known or reasonably supposed to contain oil, gas, or asphalt should be disposed of only under the terms of the new law.

2. From time to time as the desirability of maintaining a stable price for oil may in the opinion of the Secretary of Interior demand, oil, gas and asphalt lands now reserved or hereafter withdrawn shall be thrown open to entry in blocks of such size as he shall determine. In fixing the size and

position of the blocks, he shall recognize the principle that the pioneer may properly be allowed a larger area than the one who follows.

3. Prior to the opening of any lands to entry, they shall be properly surveyed and suitably monumented, and they shall be divided into tracts of 160 acres.

4. Where two or more individuals or corporations desire to lease the same tract of land the lease shall be allotted by the secretary upon the basis of competitive bids, the proffers to be in terms of royalty offered, and all royalties to be chargeable and payable in terms of the product. Whenever a lease is thus allotted to a bidder in competition with others it shall consist of such an acreage as shall be fixed in each particular case by the secretary. No lease allotted without competitive bidding shall contain more than 320 acres. No allotment shall be made of any lease or leases unless in the opinion of the secretary the individual or corporation acquiring the lease shall be financially able to develop the property completely and to care for it during and after development in the manner best calculated to bring about its greatest production and least waste, with due respect to neighboring properties.

5. Successful entrymen shall file with the secretary a good and sufficient bond to the amount of $10,000 for the faithful performance of the terms of the contract. The secretary in making these leases is empowered, in cases where he thinks it advisable, to substitute for the aforesaid bond of $10,000 either a bond in a less amount or an annual rental for the acreage reserved.

6. Lessees shall commence drilling within a specified and agreed time, and all money expended upon the lease in a bona fide effort to develop oil, gas, or asphalt, or to operate for oil, gas, or asphalt, shall apply to the extinguishment of the bond, and when the total amount so expended equals the amount of bond, the latter shall be cancelled.

7. Transfer of leases shall be valid only upon approval whenever in his judgment such transfer would be contrary to public interest; but he shall not use this power of refusal as a means to exact increased royalty.

8. The lessee shall drill each year an agreed number of wells or shall keep in operation an agreed number of strings of tools unless the local price of oil falls below a certain agreed price. If the lessee forfeits a lease, he shall retain his rights in all wells already drilled and may continue to produce from them so long as he pays the agreed royalty, and forfeited leases shall be immediately open to reletting; provided no drilling shall be done within 300 ft. of an existing well.

9. Line wells must be drilled last except where it is necessary to protect a lease against adverse drilling.

10. Net revenue from leasing the oil lands should go in large part to the state within which the lands are situated.

Revision of the Mining Laws.—By vote of the membership, Mar. 30, 1914, the following resolutions were adopted by the Society:

1. The mining law should be revised not piecemeal, but thoroughly, so as to co-ordinate and harmonize its various provisions.

2. Mining claims should be locatable regardless of a "discovery" and held only so long as the specified development work is performed previous to patenting, provision being made for the patenting and acquiring of absolute title to the property.

3. Placer locations should be limited to deposits of loose material above solid bed rock. The locater should have a preference right to locate also any lodes developed on his placer ground.

4. A statute of limitations should establish a reasonable term of years beyond which placer patents shall be immune from attack on the ground of fraud.

5. Provision should be made for the location and working of petroleum, phosphates, rare earths, haloids, and other mineral substances not specifically mentioned in the present law.

6. Full privilege of appeal to some competent court of law should be provided for in all cases of contests between rival claimants, or between a locater and the government.

7. Notice of mining locations should be so recorded as to give the fullest possible public notice.

8. The apex law should be abolished.

9. Existing titles should be reaffirmed and fully recognized and no effort should be made to create retroactive legislation.

10. For the purpose of giving the fullest consideration to the needs of every branch of the mining industry and every section of the country, it is desirable that a Government commission be created by act of Congress, whose duty it shall be to investigate by every proper means the questions and interests here referred to, and to make recommendations as a basis for the proposed mining law revision.

At a special meeting of the Society, at Washington, Dec. 16, 1915, the following resolutions were adopted:

1. The Mining Law of the United States should be revised, not piecemeal, but thoroughly, so as to co-ordinate and harmonize its various provisions.

2. For the purpose of giving the fullest consideration to the needs of every branch of the mining industry and every section of the country as affected by the mineral-land laws of the United States, it is desirable that a Government commission be created by Acts of Congress, whose duty it shall be to investigate by every proper means the questions and interests here referred to, and to make recommendations as to a basis for the proposed mining law revision.

3. That, in order to represent the classes of men whose interests will be affected, the proposed commission should consist of five members: one representing the legal profession, one representing the Department of the Interior, and three men actively interested and experienced in mining and the acquisition and handling of mineral lands.

4. That this commission shall be selected and appointed by the President of the United States.

5. That this conference believes that the services of such a commission are deserving of compensation, as well as reimbursement for all necessary expenses, but is more concerned with the actual establishment of the commission and its character than with the question of emolument; and will gladly see the work done through an honorary commission if Congress deems it advisable.

6. That this conference expresses itself in favor of the creation of a permanent committee on mining law revision, such committee to consist of five members from the Mining and Metallurgical Society of America, five from the American Institute of Mining Engineers, and five from the American Mining Congress, and to be appointed by these organizations. Such committee to have the power to select its own Chairman and Secretary, and to add to its membership not to exceed ten additional mining men or others interested in the subject for which the committee is created. The work of this committee shall be to further the interests of the mining industry through Congressional action in accordance with the resolutions adopted at this conference; and its joint report shall be presented to each of the Societies formally represented in its composition.

Professional Ethics.—The Philadelphia Section on Feb. 10, 1911, offered for the discussion of the Society a draft for a code of professional ethics. There ensued much discussion of this subject in the New York, San Francisco and Philadelphia sections, and in the bulletin of the Society; and the Council created a committee on Professional Ethics. In 1914 that committee reported that in its opinion the Society should not adopt a code of ethics. The council, Dec. 11, 1914, accepted the report of the committee and discontinued the committee on the subject. This stands as an adverse action by the Society respecting this subject.

MEMBERS.

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Gottsberger, B. Britton.....Miami, Ariz.
Gen. Mgr., Miami Copper Co.
Graton, Louis Caryl.....Cambridge, Mass.
Prof. of Mining Geology, Harvard University.
Griffith, William.....Coal Exchange Bldg., Scranton, Pa.
Mining Engineer.
Guernsey, F. W. .....Trail, B. C.
Mining Engineer.
Guess, H. A. .....120 Broadway, New York
Gen. Mgr., Federal Lead Co., and Consulting Engineer, American Smelting & Refining Co.
Hague, William .....Grass Valley, Cal.
Managing Director, North Star Mines Co.
Halberstadt, Baird.....Pottsville, Pa.
Mining Geologist.
Hansell, N. V. .....17 Battery Place, New York
Mining Engineer.
Hardinge, H. W.....50 Church St., New York
Consulting Mining and Metallurgical Engineer.
Hartranft, Samuel S. .....Norristown, Pa.
Metallurgical Engineer.
Heberlein, Kuno Berthold ..c/o American Metal Co., Ltd., 61 Bdway. N. Y.
Pres. and Gen. Mgr., Cia. Minera de Peñoles, S. A., Mexico.
Hellmann, Fred.....Chuquicamata, via Antofagasta, Chile
Consulting Mining Engineer.
Herron, D. A. .....Telluride, Colorado
Gen. Mgr., Tomboy Gold Mines Co., Ltd.
Hersam, Ernest A.....Berkeley, Cal.
Associate Prof. of Metallurgy, University of California.
Hofman, H. O.....Boston, Mass.
Prof. of Metallurgy, Mass. Inst. of Technology.
Holden, Edwin C.....Madison, Wis.
Consulting Engineer; Prof. of Mining, University of Wisconsin.
Hoover, Herbert C.....1 London Wall Bldgs., London, E. C., England
Consulting Mining Engineer.
Howe, Ernest .....77 Rhode Island Ave., Newport, R. I.
Geologist.
Huntoon, Louis D.....115 Broadway, New York
Consulting Mining Engineer.
Hutchins, J. P. .....441 Salisbury House, London, E. C., England
Mining Engineer.
Hutchinson, E. S. .....Newtown, Pa.
Civil and Mining Engineer.
Ingalls, W. R. .....10th Ave. and 36th St., New York
Mining Engineer; Editor, *Engineering and Mining Journal.*
Irving, J. D.....New Haven, Conn.
Mining Engineer; Prof. of Geology, Sheffield Scientific School.

Jackling, Daniel C. ..... Salt Lake City, Utah
Vice-Pres., Utah Copper Co.

Janeway, J. H. ..... 55 Wall St., New York
General Manager, Ore and Fuel Dept., N. J. Zinc Co.

Jennings, Hennen ..... 2221 Massachusetts Ave., Washington, D. C.
Consulting Mining Engineer.

Jennings, Sidney J. ..... 42 Broadway, New York City
Vice-Pres., U. S. Smelting, Refining and Mining Co.

Johnson, Joseph E., Jr. ..... 52 William St., New York
Consulting Engineer and Metallurgist.

Johnson, Woolsey McAlpine ..... 18 E. 41st St., New York
Consulting Engineer, Johnson Electric Smelting, Inc.

Jopling, James Edmund ..... 321 Cedar St., Marquette, Mich.
Chief Engineer, Cleveland-Cliffs Iron Co.

Keating, John B. ..... Winthrop, Shasta Co., Cal.
Mgr., Bully Hill Copper Mg. and Smg. Co.

Keith, Frank A. ..... 1219 Hollingsworth Bldg., Los Angeles, Cal.
Consulting Mining Engineer.

Kelly, William ..... Vulcan, Mich.
General Manager, Penn. Iron Mining Co.

Kemp, J. F. ..... New York City
Prof. of Geology, Columbia University.

Keyes, Charles R. ..... 944 Fifth St., Des Moines, Iowa
Geologist.

Kimball, Edwin B. ..... 284 Mountain Ave., Piedmont, Cal.
Mining Engineer.

Kinzie, Robert Allen ..... First Nat. Bank Bldg., San Francisco, Cal.
Mining Engineer.

Kirby, Edmund Burgis ..... 918 Security Bldg., St. Louis, Mo.
Consulting Mining and Metallurgical Engineer.

Knox, H. H. ..... 82 Beaver St., New York City
Mining Engineer.

Knox, Newton Booth ..... 9 Upper Hamilton Terrace, London, Eng.
Consulting Engineer.

Kuehn, A. F. ..... 1 London Wall Bldgs., London, E., C., England
Mining Engineer.

Laird, George A. ..... 98 Raglan St., Mosman, Sidney, N. S. W., Australia
Consulting Mining Engineer.

Lawall, Elmer H. ..... Wilkesbarre, Pa.
Mining Engineer.

Lawrence, Benjamin B. ..... 60 Wall St., New York
Consulting Mining Engineer.

Lawson, A. C. ..... Berkeley, Cal.
Dean, School of Mining, University of California.

Lawton, Charles L. ..... Hancock, Mich.
Gen. Mgr., Quincy Mining Co.

Le Fevre, Solomon ..... Forest Glen, Ulster County, New York
Consulting Mining Engineer.

Leggett, Thomas H. ..... 149 Broadway, New York
Consulting Mining Engineer.

Lewis, J. Volney ..... New Brunswick, N. J.
Prof. of Geology and Mineralogy, Rutgers College.

Liddell, Donald M. ..... 10th Ave. and 36th St., New York
Associate editor, *Engineering and Mining Journal.*

Lindberg, C. O. ..... 506 Union League Bldg., Los Angeles, Cal.
Consulting Mining Engineer.

Lindgren, Waldemar ..... Boston, Mass.
Head of Dept. of Geology, Mass. Inst. of Technology.

Lindsley, Halstead .....60 Broadway, New York
Mining Engineer.

Linton, Robert .....525 Penn Ave., Pittsburgh, Pa.
Consulting Mining Engineer.

Lloyd, Richard L.....29 Broadway, New York
Consulting Metallurgical Engineer.

Loring, Frank C. .....Home Life Bldg., Toronto, Ont.
Mgr., Wettlaufer-Lorrain Silver Mines, Ltd.

Ludlow, Edwin .....Lansford, Penn.
Vice-President, Lehigh Coal & Navigation Co.

Lyman, Benjamin Smith .....708 Locust St., Philadelphia, Pa.
Mining Engineer.

Lyon, Dorsey A. .....University of Utah, Salt Lake City, Utah
Metallurgist, Dept. of Met. Research.

McClelland, James F.....Drawer C., Yale Sta., New Haven, Conn.
Prof. of Mining Engineering, Yale University.

McCreath, Andrew S.....Harrisburg, Pa.
Consulting Chemist.

McMeekin, Charles W. .....1270 Pine St., San Francisco, Cal.
Mining Engineer.

Maclennan, Francis William .....Miami, Ariz.
Asst. Manager, Miami Copper Co.

MacNaughton, James W.....Calumet, Mich.
Gen. Mgr., Calumet & Hecla Mining Co.

Magnus, Benjamin ...care of Gen. Development Co., 61 Bdway., New York
Consulting Engineer.

Malcolmson, J. W.....3728 Main St., Kansas City, Mo.
Mining Engineer.

Mann, William S.....Hotel Alexandria, Cananea, Sonora, Mexico
Mining and Metallurgical Engineer. Mining Engineer.

Mein, William Wallace.....43 Exchange Pl., New York
Gen. Mgr., Canadian Mining & Exploration Co., Ltd.

Melzer, Gustav Emil.....Baker City, Ore.
Consulting Mining Engineer and Metallurgist.

Mercer, John W..... .....15 Broad St., New York City
Mine Manager.

Merriam, W. N.....Duluth, Minn.
Geologist.

Merrill, Chas. W.....121 Second St., San Francisco, Cal.
Consulting Metallurgical Engineer.

Merrill, F. J. H.....216 Union League Building, Los Angeles, Cal.
Mining Engineer and Geologist.

Metcalfe, G. W.....Kennett, Cal.
Manager, Mammoth Copper Mining Co.

Moore, George .....330 W. 102nd St., New York
Consulting Metallurgist.

Moore, P. N.....611 Merchants' Laclede Bldg., St. Louis, Mo.
Mining Engineer.

Mudd, Seeley W. .....1208 Hollingsworth Bldg., Los Angeles, Cal.
Mining Engineer.

Munro, Charles H.....1057 Monadnock Bldg., San Francisco, Cal.
Gen. Mgr., Wild Goose Mining and Trading Co.

Munroe, H S. .....Litchfield, Conn.
Emeritus, Professor of Mining, Columbia University.

Nason, Frank, L. .....West Haven, Conn.
Geologist and Mining Engineer.

Newsom, John F.....Stanford University, Cal.
Associate Prof. of Mining, Stanford University.
Nichols, Ralph.....Gilmore, Idaho
Consulting Mining and Metallurgical Engineer.
Norris, Robert Van A.....520 Second Nat. Bank Bldg., Wilkesbarre, Pa.
Consulting Mining Engineer.
Notman, Arthur.....Bisbee, Arizona
Geologist, Copper Queen Con. Mining Co.
Oliver, Edwin Letts.....503 Market St., San Francisco, Cal.
Consulting Metallurgist; Mgr., Oliver Continuous Filter Co.
Packard, George A.....50 Congress St., Boston, Mass.
Metallurgist and Mining Engineer.
Parker, E. W.....1032 Miners' Bank Building, Wilkes-Barre, Pa.
Parker, Richard A. .....802 Equitable Bldg., Denver, Colo.
Consulting Mining Engineer.
Parsons, Floyd W. .....10th Ave. and 36th St., New York
Editor, *Coal Age*.
Patterson, G. S.....Vivian, McDowell Co., W. Va.
Mining Engineer.
Payne, Henry M. .....233 Broadway, New York
Mining Engineer.
Peele, Robert.....New York City
Prof. of Mining, Columbia University.
Penrose, R. A. F., Jr.....460 Bullitt Bldg., Philadelphia, Pa.
Consulting Mining Geologist.
Perry, Oscar B.....165 Broadway, New York City
Gen. Mgr., Yukon Gold Co.
Pierce, Frederic Emery .....35 Nassau St., New York
Consulting Engineer.
Polhemus, J. H. .....55 Wall St., New York
Asst. Gen. Mgr. of Mines, New Jersey Zinc Co.
Pomeroy, William A. .....947 Waverly St., Palo Alto, Cal.
Mining Engineer.
Pratt, Joseph H.....Chapel Hill, N. C.
State Geologist and Prof. of Geology, Univ. of North Carolina.
Prichard, Wm. A., c/o Oroville Drdg. Ltd..634 Mills Bldg., San Francisco, Cal.
Mining Engineer.
Pumpelly, Raphael.....Newport, R. I.
Geologist.
Pyne, Francis R. .....Chrome, N. J.
Asst. Supt., U. S. Metals Refining Co.
Queneau, Augustin Leon Jean .....Jemeppe, sur Meuse, Belgium
Metallurgical Engineer.
Rawlings, Stuart L. .....West Coast Life Bldg., San Francisco, Cal.
Mining Engineer.
Raymond, R. M. .....61 Broadway, New York
Managing Director, The Exploration Co. of England and Mexico.
Requa, M. L.....1026 Crocker Bldg., San Francisco, Cal.
Mining Engineer.
Rice, George S. .....40th and Butler Sts., Pittsburgh, Pa.
Mining Engineer, U. S. Bureau of Mines.
Richards, Robert H.....Boston, Mass.
Prof. Emeritus of Mining and Metallurgy, Mass. Inst. of Technology.
Rigg, Gilbert .....Palmerton, Pa.
Head of Research Dept., N. J. Zinc Co.
Riordan, D M.....Room 616, 525 Market St., San Francisco, Cal.
Mining Engineer.
Rissmann, Otto .....Bartlesville, Okla.
Gen. Mgr., National Zinc Co.

Riter, George W.....Deseret Nat. Bank Bldg., Salt Lake City, Utah
Sec'y and Mgr., Eureka Hill Mining Co.

Robbins, Percy A. .....Timmins, Ontario
Gen. Mgr., Hollinger Gold Mines, Ltd., etc.

Roberts, Milnor.....University Sta., Seattle, Wash.
Professor of Mining Engineering and Metallurgy, University of Washington.

Robertson, William Fleet.....Department of Mines, Victoria, B. C.
Provincial Mineralogist of British Columbia.

Rogers, Alexander P.....60 Broadway, New York
Consulting Mining Engineer.

Rogers, Allen H.....201 Devonshire St., Boston, Mass.
Consulting Mining Engineer.

Rogers, Edwin M. .....32 Broadway, New York
Consulting Engineer.

Rohn, Oscar .....Butte, Mont.
Mining Engineer.

Ropp, Alfred von der.....233 Broadway, New York
Representative, Cons. Gold Fields of South Africa, Ltd.; also Mgr., Gold Fields American Development Co., Ltd.

Sales, Reno H.....Box 457, Butte, Mont.
Geologist for Amalgamated Copper Co.

Sanders, Richard H.....605 Drexel Bldg., Philadelphia, Pa.
Mining Engineer.

Saulles, C. A. H., de.....165 Broadway, New York
Vice-Pres. and Gen. Mgr., U. S. Zinc Co.; Met. Engr., American Smelting & Refining Co.

Saunders, William L. .....11 Broadway, New York
Chairman, Board of Directors, Ingersoll-Rand Co.

Schrader, F. C.....Washington, D. C.
Geologist, U. S. Geological Survey.

Sharpless, F. F.....52 Broadway, New York City
Mining Engineer.

Sharwood, Wm. J. .....Lead, South Dakota
Metallurgical Chemist, Homestake Mining Co.

Shaw, Silas Frederick .....3800 Broadway, San Antonio, Texas
Supt., Mina Tiro General.

Sherman, Gerald .....Bisbee, Arizona
Superintendent, Mine Department Copper Queen Con. Mining Co.

Shockley, W. H.....First Nat. Bank Bldg., San Francisco, Cal.
Mining Engineer.

Sizer, F. L. .....701 1st National Bank Building, San Francisco, Cal.
Mining Engineer.

Smith, E. A. Cappelen .....165 Broadway, New York
Consulting Metallurgical Engineer, M. Guggenheim's Sons.

Smith, Franklin W.....Bisbee, Ariz.
Consulting Mining Engineer.

Smith, George Otis.....Washington, D. C.
Director U. S. Geological Survey.

Smith, William A..... ..Herculaneum, Mo.
Mgr., St. Joseph Lead Co.

Smoot, Albert M. .....99 John St., New York
Technical Director, Ledoux & Co.

Smyth, H. L.....Cambridge, Mass.
Prof. of Mining and Metallurgy, Harvard University.

Spaulding, M. B.....Oliver Bldg., Pittsburgh, Pa.
Mgr., Pittsburgh District of Crocker-Wheeler Co.

Spilsbury, E. G.....45 Broadway, New York City
Mining Engineer.

Spurr, J. E.....571 Bullitt Bldg., Philadelphia, Pa.
Vice-Pres., Tonopah Mining Co.

Starr, George W.....Grass Valley, Cal.
Supt., Empire and Pennsylvania Mines.

Staunton, Wm. F.....512 So. Harvard Blvd., Los Angeles, Cal.
Consulting Mining Engineer.

Steubing, Wm. C.....327 East 4th St., Tucson, Arizona
Examining Engineer, Helvetia Copper Co.

Stone, George C.....55 Wall St., New York City
President and Chief Engineer, New Jersey Zinc Co.

Stonestreet, George D. .....
Consulting Mining Engineer.

Stoughton, Bradley.....29 W. 39th St., New York
Sec'y, Am. Inst. of Min. Engrs.

Stow, Audley H.....Pocahontas, Va.
Chief Engineer, Pocahontas Collieries Co.

Susmann, Julius H.....61 Broadway, New York
Consulting Mining Engineer.

Sussman, Otto .....61 Broadway, New York
Consulting Mining Engineer.

Symmes, Whitman.....Virginia City, Nev.
Supt., Mexican Gold & Silver Mining Co.

Thacher, Arthur.....Roe Bldg., St. Louis, Mo.
Mining Engineer.

Thomson, Samuel C. .....120 Broadway, New York
Consulting Mining Engineer.

Tillson, Benjamin F.....Franklin Furnace, N. J.
Head of Mining Dept., N. J. Zinc Co.

Turner, Henry W. .....634 Mills Bldg., San Francisco, Cal.
Mining Geologist.

Tyrrell, Joseph B.....534 Confederation Life Chambers, Toronto, Ontario
Mining Geologist and Consulting Engineer.

Van Arsdale, G. D. .....99 John St., New York
Research Chemist, Phelps, Dodge & Co.

Van Law, Carlos Whitney .....55 Congress St., Boston, Mass.
Mgr. for Mexico, U. S. Smelting, Refining & Mining Co.

Van Mater, Joseph A. .....55 Wall St., New York City
Manager of Mines, New Jersey Zinc Co.

Walker, Arthur L. .....New York City
Prof. of Metallurgy, Columbia University.

Waterman, Douglas .....Box 1735, Habana, Cuba

Webb, Harry H. .....233 Broadway, New York
Consulting Engineer, Consolidated Gold Fields of So. Africa.

Weed, Walter Harvey .....29 Broadway, New York City
Consulting Mining Engineer.

Weeks, Francis D. .....61 Broadway, New York
Metallurgical Engineer, American Metal Co.

Welch, J. Cuthbert .....Box 248, Tooele, Utah
Metallurgical and Mining Engineer.

Wells, Bulkley.....Telluride, Colorado
President and General Mgr., Smuggler Union Mining Co., etc.

Westervelt, William Young .....17 Madison Ave., New York City
Consulting Mining Engineer.

Wethey, Arthur H. .....Lemoore, Cal.
Mining Engineer.

Whitaker, Orvil Robert.....932 Equitable Bldg., Denver, Colo.
Consulting Engineer of Mines.

White, Rush J. .....519 Bank St., Wallace, Ida.
Mining Engineer.
White, Robeson T. .....care of Guaranty Trust Co., New York
Mining Engineer
Whitley, Charles Walter .....Salt Lake City, Utah
Gen. Mgr., Utah Dept., American Smelting & Refining Co.
Wiard, Edward S. .....417 Boston Bldg., Denver, Colo.
Mining Engineer.
Wilkens, H. A. J. .....142 E. 18th St., New York
President, Mines Management Co.
Williams, Ralph, B. .....81 Gibbs St., Brookline, Mass.
Mining Engineer.
Wilmot, H. C. .....Baker, Oregon
Wilson, William A. .....Salt Lake City, Utah
Consulting Mining Engineer.
Winchell, Alexander N. .....Madison, Wis.
Prof. of Geology, University of Wisconsin.
Winchell, H. V.....826 First National-Soo Line Bldg., Minneapolis, Minn.
Geologist.
Wright, Louis A.....Casilla 112 D. Santiago, Chile
Consulting Mining Engineer.
Yeatman, Pope .....165 Broadway, New York City
Mining Engineer.
Young, George J. .....Minneapolis, Minn.
Prof. of Mining, Minn. State School of Mines.

Total members.....269

DECEASED MEMBERS.

	DATE
Bettles, Alfred J.	Aug. 3, 1911
Blake, William P.	May 22, 1910
Buckley, E. R.	Jan. 19, 1912
Carpenter, Franklin R.	April 1, 1910
Christy, S. B.	Nov. 30, 1914
Comstock, Theodore B.	July 26, 1915
Dudley, Charles B.	Dec. 21, 1909
Emmons, Samuel Franklin	Mar. 28, 1911
Forrester, Robert	Dec. 20, 1910
Guiterman, Franklin	May 2, 1915
Havard, F. T.	May 22, 1913
Hill, Frank A.	July 13, 1915
Hoffmann, A. O.	1913
Holmes, Joseph A.	July 13, 1915
Lathrop, W. A.	April 12, 1912
Maynard, George W.	Feb. 13, 1913
Patch, Maurice B.	Dec. 2, 1913
Potter, W. B.	July 13, 1914
Shelby, Charles F.	Jan. 25, 1911
Sutton, Linton B.	June 11, 1911
Thompson, Heber S.	Mar. 9, 1911

MEMBERSHIP
GEOGRAPHICALLY ARRANGED.

ALASKA
TREADWELL
Bradley, P. R.

ARIZONA
BISBEE
Notman, A.
Sherman, G.
Smith, F. W.
DOUGLAS
Addicks, L.
Douglas, J. S.
HUMBOLDT
Colvocoresses, G. M.
MIAMI
Gottsberger, B. B.
Maclennan, F. W.
RAY
Cates, L. S.
TUCSON
Steubing, W. C.

ARKANSAS
LITTLE ROCK
Fuller, J. T.

CALIFORNIA
BERKELEY
Hersam, E. A.
Lawson, A. C.
CISCO
Mann, W. S.
GRASS VALLEY
Foote, A. B.
Foote, A. DeW.
Hague, W.
Starr, G. W.
KENNETT
Metcalfe, G. W.
LEMOORE
Wethey, A. H.
LOS ANGELES
Arnold, R.
Gormley, S. J.
Keith, F. A.
Lindberg, C. O.
Merrill, F. J. H.
Mudd, S. W.
Staunton, W. F.
NEVADA CITY
Derby, C. C.
OAKLAND
Benjamin, E. H.
Browne, R. E.
Butters, C.
PALO ALTO
Clevenger, G. H.
Pomeroy, W. A.
PIEDMONT
Kimball, E. B.
SAN FRANCISCO
Bradley, F. W.
Brayton, C. C.
Bretherton, S. E.
Burch, A.
Caetani, G.
Cottrell, F. G.
Kinzie, R. A.
McMeekin, C. W.
Merril, C. W.
Munro, C. H.
Oliver, E. L.
Prichard, W. A.
Rawlings, S. L.
Requa, M. L.
Riordan, D. M.
Shockley, W. H.
Sizer, F. L.
Turner, H. W.
SANTA BARBARA
Boutwell, J. M.
STANFORD UNIVERSITY
Newsom, J. F.
WINTHROP
Keating, J. B.

COLORADO
DENVER
Argall, P.
Bancroft, H.
Beeler, H. C.
Chase, C. A.
Collins, G. E.
Farish, J. B.
Finch, J. W.
Parker, R. A.
Whitaker, O. R.
Wiard, E. S.
LEADVILLE
Argall, G. O.
TELLURIDE
Herron, D.
Wells, B.

CONNECTICUT
NEW HAVEN
Irving, J. D.
McClelland, J. F.
WALLINGFORD
Canby, R. C.
WEST HAVEN
Nason, F. L.

IDAHO
GILMORE
Nichols, R.
KELLOGG
Easton, S. A.
WALLACE
White, R. J.

ILLINOIS
EVANSTON
Grant, U. S.

IOWA
DES MOINES
Keyes, C. R.

MARYLAND
BALTIMORE
Clark, W. B.

MASSACHUSETTS
BOSTON
Hofman, H. O.
Lindgren, W.
Packard, G. A.
Richards, R. H.
Rogers, A. H.
Van Law, C. W.
BROOKLINE
Williams, R. B.
CAMBRIDGE
Graton, L. C.
Smyth, H. L.

MICHIGAN
CALUMET
MacNaughton, J. W.
HANCOCK
Lawton, C. L.
HOUGHTON
Cairns, F. I.
ISHPEMING
Duncan, M. M.
MARQUETTE
Jopling, J. E.
VULCAN
Kelly, W.

MINNESOTA
DULUTH
Merriam, W. N.
MINNEAPOLIS
Appleby, W. R.
Winchell, H. V.
Young, G. J.

MISSOURI
HERCULANEUM
Smith, W. A.
KANSAS CITY
Malcolmson, J. W.
ST. LOUIS
Bilharz, O. M.
Kirby, E. B.
Moore, P. N.
Thacher, A.

MONTANA
BUTTE
Bruce, J. L.
Goodale, C. W.
Rohn, O.
Sales, R. H.

NEVADA
TONOPAH
Bradshaw, F. T.
VIRGINIA CITY
Symmes, W.
WONDER
Burgess, J. A.

NEW JERSEY
CHROME
Deacon, R. W.
Pyne, F. R.
FRANKLIN FURNACE
Catlin, R. M.
Tillson, B. F.
NEW BRUNSWICK
Lewis, J. V.
SEWAREN
Cowles, A. H.

NEW YORK
FOREST GLEN
Le Fevre, S.
NEW YORK
Addicks, L.
Aldridge, W. H.
Allen, J. H.
Ball, S. H.
Barbour, P. E.
Bartholomew, G. P.
Berry, E. S.
Browne, D. H.
Channing, J. P.
Clark, C. D.
Clements, J. M.
Corning, C. R.
Cox, W. R.
Devereux, W. B., Jr.
Dorr, J. V. N.
Dufourcq, E. L.
Dwight, A. S.
Eurich, E. F.
Finlay, J. R.
Garrey, G. H.
Guess, H. A.
Hansell, N. V.
Hardinge, H. W.
Heberlein, K. B.
Huntoon, L. D.
Ingalls, W. R.
Janeway, J. H.
Jennings, S. J.
Johnson, J. E., Jr.
Johnson, W. McA.
Kemp, J. F.
Knox, H. H.
Lawrence, B. B.
Leggett, T. H.
Liddell, D. M.
Lindsley, H.
Lloyd, R. L.
Magnus, B.
Mein, W. W.
Mercer, J. W.
Moore, Geo.
Munroe, H. S.
Parsons, F. W.
Payne, H. M.
Peele, R.
Perry, O. B.
Pierce, F. E.
Polhemus, J. H.
Prichard, W. A.
Raymond, R. M.
Rogers, A. P.
Rogers, E. M.
Ropp, A. von der
Saulles, C. A. H. de
Saunders, W. L.
Sharpless, F. F.
Smith, E. A. C.
Smoot, A. M.
Spilsbury, E. G.
Stone, G. C.
Stoughton, B.
Susmann, J. H.
Sussman, O.
Thomson, S. C.
Van Arsdale, G. D.
Van Mater, J. A.
Walker, A. L.
Webb, H. H.
Weed, W. H.
Weeks, F. D.
Westervelt, W. Y.
White, R. T.
Wilkens, H. A. J.
Yeatman, P.

NORTH CAROLINA
CHAPEL HILL
Cobb, C.
Pratt, J. H.

OHIO
CLEVELAND
Crowell, B.
Fulton, C. H.

OKLAHOMA
BARTLESVILLE
Rissmann, O.

OREGON
BAKER CITY
Melzer, G. E.
Wilmot, H. C.

PENNSYLVANIA
HARRISBURG
McCreath, A. S.
LANSFORD
Ludlow, E.

NEWTOWN
Hutchinson, E. S.

NORRISTOWN
Hartranft, S. S.

PALMERTON
Rigg, G.

PHILADELPHIA
Chance, H. M.
Conner, E. T.
d'Invilliers, E. V.
Du Bois, H. W.
Fairchild, S. E., Jr.
Garrison, F. L.
Lyman, B. S.
Penrose, R. A. F., Jr.
Sanders, R. H.
Spurr, J. E.

PITTSBURGH
Linton, R.
Rice, G. S.
Spaulding, M. B.

POTTSVILLE
Halberstadt, B.

SCRANTON
Griffith, W.

SOUTH BETHLEHEM
Drinker, H. S.

WILKESBARRE
Lawall, E. H.
Norris, R. V.
Parker, E. W.

RHODE ISLAND

NEWPORT
Howe, E.
Pumpelly, R.

SOUTH DAKOTA

LEAD
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